The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XIII. No. 338 DECEMBER 5, 1925 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.4.0.

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, *Bouverie St., London, E.C.4.*

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

Dyestuff Reconstruction

RUMOUR is already busy concerning negotiations for the completion of an Anglo-German dyestuffs agreement. It is said that Professor Bosch, managing director of the Badische Anilin Co., of Ludwigshafen, and Herr C. von Weinberg, of Frankfort, are shortly to visit London to meet representatives of the British Dyestuffs Corporation for this purpose. Whether such a visit has actually been arranged or the report is mere speculation we cannot, at the moment, say, but in any case it would be improbable that the B.D.C., having secured freedom from Government control as one of the terms of the recent reconstruction, should fail to take advantage of the liberty it has secured. The negotiations from the German side would naturally be in charge of Dr. Bosch, whose name is associated with that of Haber in connection with the Haber-Bosch synthetic ammonia process, and who is the head of the new German combine, formed out of the old members of the I.G. to consolidate manufacturing and sales organisation and generally to improve the efficiency of the German dyestuffs industry. On the British side the negotiations presumably will be largely in the hands of the recently appointed managing director of the B.D.C., Dr. E. F. Armstrong, who will meet the best of the German chemists on equal terms, and whose association with Lever Brothers, Ltd., has given him a valuable insight into international trade agreements and organisation.

In such circumstances, it is difficult to believe that any scheme would be accepted that would leave organic chemistry in Great Britain at the mercy of Germany or place dyestuff research and technology in this country in a position of dependence on German dyestuffs firms. So far as the Corporation itself is concerned, no agreement would have any attraction unless it guaranteed some advantage, both present and future, over the existing position. It is possible that firms outside such an agreement may be affected. That, however, is the case in all such arrangements. It may be recalled, moreover, that in pre-war days, without any artificial protection against German competition such as exists to-day, a group of British dyestuff firms held their own by producing good stuff and serving their customers well. What they did then they may prove themselves to be able to do now.

By-Product Oxygen

IN his recent paper before the Institute of Welding Engineers, Mr. A. E. Knowles drew attention to the extraordinary change-over which has taken place during the last decade in the relative demands for oxygen and hydrogen for industrial purposes. Mr. Knowles was speaking primarily of electrolytic processes and he mentioned the fact that in the earlier days of these processes there was practically no demand for the hydrogen which was produced concurrently with the oxygen. The rapid developments in processes of hydrogenation, and particularly in connection with the hydrogenation of oils, have, however, more or less reversed the former position, and an indication of the surplus oxygen available may be gathered from the fact that at one time electrolytic plants were supplying hydrogen for the treatment of about 4,000 tons of oil a week, and thereby producing about 10 million cubic feet of by-product oxygen per week. The point is, perhaps, more significant when it is considered in conjunction with the production of synthetic ammonia, and more particularly in connection with continental practice, where the supply of hydrogen is frequently derived from electrolytic plant. Many such hydrogen plants are already in operation and many more are under consideration, while in the majority of the plants now working, the oxygen is wasted. The question which immediately rises, therefore, is whether the large quantities of by-product oxygen produced

must not sooner or later become an economic factor in controlling the price of oxygen as more commonly made from industrial purposes by other methods. At the present time the charge made for oxygen in normal-sized cylinders ranges round 30s. per 1,000 cubic feet, and much depends, of course, upon whether electrolytic producers could collect, compress, and transport their surplus gas at a lower rate

The Rating of Machinery

OUR readers will remember that in the new Bill for reorganising our whole system of rating, there is a clause, No. 24, proposing that, following the recommendation of the report of the Departmental Committee which met some months ago, certain important classes of machinery should be definitely declared exempt from rating. The Committee in the House of Commons consist only of about 60 members, and Mr. Neville Chamberlain wisely announced in the committee that the important matter of the rating of machinery should be left for further consideration in the House and that a vote should be given independently of the Party Whips. The debate in Parliament was one of considerable interest.

The case was best put by Mr. Runciman who, as a leading figure in the banking and industrial world, as well as an ex-President of the Board of Agriculture, may be supposed to have a practical knowledge of both sides of the question. He pleaded first for uniformity of treatment on this subject. There was no uniformity at present. Next, he dealt with the practical application of rating to a single important industry, namely, shipbuilding. The example he took was that of cranes. A yard with ordinary wooden poles serving this purpose would be exempt from rating for the same, as they would not be classed as machinery; but the man who put in overhead travelling electric cranes would immediately find himself the victim of a heavy increase in local taxation.

This point of uniformity was further emphasised by Mr. Neville Chamberlain, who gave three reasons for supporting the clause. The first was that the present system is partial in its incidence, inequitable, and not in accordance with the fundamental principles of rating. If a man rents an office, he puts in what furniture he likes, and the rating is unaffected whether the furniture is costly or cheap. By parity of reasoning a man who puts better machinery into his works should not be adversely affected thereby. The second reason put forward by Mr. Chamberlain was that the change was timely, especially at a season when above all things it was necessary for this country to keep thoroughly ahead in its equipment. His third reason was that if the de-rating of machinery actually reduced unemployment, as he hoped it would, the manufacturers and the ratepayers would both gain thereby. Those who opposed the clause declared that it would add to the burdens of the other ratepayers, and one member estimated the addition in Sheffield to be equal to 2s., and in Rotherham to 3s. in the £.

All parties were sharply divided on the issue, Colonel Wedgwood and other Labour members voting with Conservatives and Liberals in favour of de-rating, and Mr. Ramsay McDonald, in company with other members of both parties, going into the "No" Lobby. The clause was carried by an overwhelming majority, the figures being 324 to 106.

Chemical Workers' Wages

IMPORTANT negotiations have been started between the Drug and Fine Chemical Manufacturers' Association and the National Drug and Chemical Union respecting the Union's proposals (published in this issue) for a revision of the conditions laid down in the standard agreement. At the moment the result of the first conference has not reached us, and it is unlikely that all the details will have been disposed of at one sitting. The proposals affect roughly about 150 chemical firms and 15,000 workers. The suggestions that night overtime should be paid at the rate of time-and-a-half and that the annual holiday should be increased from six to twelve days are not matters of fundamental importance. The more vital proposals are those which fix minimum rates for foremen, forewomen, deputy foremen, male charge hands, and female charge hands, varying from 20s. to 5s. above grade rates, and which, by changing the definition of such workers, would have the effect of transferring a good proportion of them from a lower to a higher class, with a corresponding advance of pay. In theory, there ought to be no difficulty in conceding to a first-grade worker the pay recognised for that grade, but in works practice, particularly in chemical works, classification is not quite so simple as on paper. Without knowing all the details it is difficult to judge, and we must defer any comments until a fuller statement of the case is available from both sides.

Development of Flotation Methods

THE concentration of mineral ores by modern processes of flotation, although the principle is a comparatively new one, has already become firmly established. Curiously enough, there is no evidence of any striking extension of flotation methods in this country, but the progress registered in America is little short of remarkable. Figures recently issued by the United States Bureau of Mines show that in 1924 no less than 45 million tons of ore were treated by flotation, about 2¼ million tons of concentrates being thereby produced. This shows an increase of nearly 100 per cent. on the figures for the amount of ore treated six years ago. Copper ores form by far the greatest tonnage of the many raw substances which lend themselves to the process, and the improvement that has followed as greater experience has been obtained is indicated by the fact that whereas in 1923 the concentration ratio was 18·57 to 1, it is now 21·23 to 1.

It is interesting to note that over a dozen reagents are now commonly used, but with copper ores various coal tars and creosotes are the heavy mediums most generally employed, pine oil being utilised as the frothing agent. The general practice has been, too, to use sulphuric acid and petroleum acid sludge to form the acid circuits. It would seem that during the latter part of 1924, flotation practice was undergoing a somewhat radical change, and many plants operated experimental units using an alkaline circuit together with soluble frothing reagents, such as the xanthates. As

a result many have altered their practice materially, and at the present time great progress in metallurgical efficiency is being made. Differential flotation practice, or the flotation of one mineral from another or others in the presence of gangue, is, moreover, rapidly being perfected. This is carried out, not solely by the use of oils and acids or alkaline reagents, but by chemicals and modifying agents that are positive in their reactions on certain sulphide minerals while others are unaffected. Advantage is taken of these facts, and chemical combinations can be added which retard certain minerals very materially in their degree of flotability. It is desirable, of course, to retard the unwanted constituents such as pyrites and exclude them from lead and zinc minerals as well as from copper minerals, where the " dropping " of pyrites can be effected without a sacrifice of a material amount of the desirable minerals.

The Chemistry of Tetraethyl Lead

THE prohibition in the United States of the sale of petrol treated with tetraethyl lead, following the death of five men handling ethylene gasolene at the Baywater factory of the Standard Oil Co., has resulted in a good deal of research on the toxic properties of this " anti-knock " reagent. The results of experiments with tetraethyl lead on animals were recently discussed in a paper by Mr. T. Midgley and the conclusion reached left some doubt as to whether the fears upon which the prevention of the sale were based were as real as imagined in the first instance. The specific effect of tetraethyl lead as " anti-knock " reagent is firmly established, however, the treatment of petrol with this compound on a commercial scale showing that it fulfilled every requirement expected from it, and it was perhaps unfortunate that some of the American States took such steps before a fuller inquiry had been made into the properties of the substance. While the method of preparation of tetraethyl lead is already known, having been disclosed by patents dating back to 1922, the theory of " anti-knock " reagents has not hitherto been generally understood, and some interesting explanations are advanced in the translation of Dr. Frydlender's article that appears in this issue. Two of these theories suggest that the special property of tetraethyl lead depends on the lead constituent of the compound. The first supposes that at about 400° C. the compound decomposes into minute droplets of metallic lead, which in turn adhere to the particles in the gas mixture, such as dust, modifying their radius of curvature and so increasing the critical pressure at which the mixture explodes. The second theory resembles the first, but the droplets of lead exercise a negative catalytic effect on the propagation of the explosive wave produced in the gas mixture by attracting the electrons with which the particles of the flame are charged, so lowering the degree of ionisation of the mixture.

These theories afford a reasonable explanation of the way in which tetraethyl lead reduces " knocking " in petrol-air mixtures, but a more unorthodox and therefore perhaps a more interesting explanation is that advanced by Moreu and Dufraisse at the recent Congress of Industrial Chemistry in Paris. In 1922 they discovered that certain substances exercised an inhibitory effect in explosion reactions, which they described as the " anti-oxygen effect," and they connect the theory of " anti-knock " reagents with this earlier theory. Certain readily explosable materials, such as acrolein, are stabilised by minute traces of phenolic substances and, to take a specific example, one part of hydroquinone in 20 thousand of acrolein practically prevents all oxidation. In order to explain this they assume that the hydroquinone acts as a stabiliser, in presence of which complete oxidation does not at once come about, but a peroxide is formed. This in turn gives up an atom of oxygen which unites with the stabiliser, and as the two peroxides so formed cannot co-exist the original materials are at once regenerated. In other words, the stabiliser has a negative catalytic effect on the reaction and so retards detonation.

The authors are careful to point out, however, that even in the presence of a stabiliser complete oxidation may take place, that is to say, the stabiliser is sometimes able to act as a positive catalyst as well as a negative one, and while it is possible that they have indicated the lines on which research should be conducted, if an explanation of the " anti-knock " action of tetraethyl lead is to be found, further research on the theory will be necessary if this divergence is to be explained.

The Calendar

1925 Dec.		
7	Royal Society of Arts (Cantor Lecture) : " Coal Ash and Clean Coal " (Lecture III). Dr. R. Lessing.	John Street, Adelphi, London, W.C.2.
7	Society of Chemical Industry and Institute of Chemistry (London Sections) : " Five Years of Progress in the Fine Chemical Industry." W. J. U. Woolcock. 8 p.m.	Institution of Mechanical Engineers, Storey's Gate, London.
8	Institution of Petroleum Technologists : " The Selection and Properties of Steels Used for Oil Well Boring Equipment." J. H. S. Dickenson, B. Gray, and F. E. Cherry. 5.30 p.m.	Royal Society of Arts, John Street, Adelphi, London.
8	Society of Chemical Industry (Birmingham and Midland Section) : " The Fermentation of Cacao Shell." A. Churchman. 7.15 p.m.	University Buildings, Edmund Street, Birmingham.
8	Institution of Petroleum Technologists : " Oil Well Tool Steel." P. N. Rogers.	Aldine House, Bedford Street, Strand, London.
9	Institution of Chemical Engineers : " Magnetic Separation." Col. B. Rolling.	Burlington House, Piccadilly, London.
9	Leicester Literary and Philosophical Society (Chemistry Section) : "Lubrication." Dr. A. E. Dunstan. 8 p.m.	Museum, New Walk, Leicester.
10	Oil and Colour Chemists' Association. Joint Discussion with the Incorporated Institute of British Decorators on " The Conditions of Application which Influence the Durability of Paint and Varnish."	Painters' Hall, Little Trinity Lane, London, E.C.4.
10	Society of Chemical Industry (Bristol Section.) Joint meeting with the Chemical Society : " The Use of X-rays in Chemistry." S. H. Piper. 7.30 p.m.	The University, Bristol.
10	Institute of Metals (London) : " Commercial Aluminium Alloys from the Users' Point of View." J. B. Hoblyn. 7.30 p.m.	85-88, The Minories, Tower Hill, London, E.1.
11	Manchester University : Ludwig Mond Lecture, " Adhesion, Friction and Chemical Constitution." Sir W. B. Hardy.	Manchester.

Tetraethyl Lead as "Anti-Knock" Reagent

A New French Theory

The following article, by Dr. J.-H. Frydlender, is translated from a recent issue of "La Revue des Produits Chimiques," and gives details of the preparation and properties of tetraethyl lead and the various theories, including a new French explanation, of its action as "anti-knock" reagent in internal combustion engines.

VARIOUS attempts have been made to avoid the disadvantages of "knocking" in internal combustion engines. The injection of water vapour during compression, for instance, diminishes this effect by absorbing the heat of compression, while another method consists in adding 90-95 per cent. alcohol to the fuel. It is, of course, well known that alcohol containing water will not mix with petrol, although a homogeneous mixture can be obtained by adding benzol or ether. According to Low, however, this is not always necessary, as vibration brings about the formation of an emulsion that functions normally in a warm engine. A cold engine does not start well with petrol containing aqueous alcohol, and for this reason the manufacture of anhydrous spirit has largely been pursued in France. Mixtures of petroleum and benzol derivatives are sold under various names in Germany. The use of ethyl alcohol as "anti-knock" reagent might perhaps be replaced by methyl alcohol, which has recently been synthesised on an industrial scale both in Germany and France.

At present the most important "anti-knock" reagent is tetraethyl lead, the powerful action of which was discovered in America, in 1922, by T. Midgley, of the General Motor Research Corporation. It should, however, be noted that M. Dumanois had also been led, in the course of his research, to the use of tetraethyl lead, but owing to the cost of the product he did not pursue his investigations far enough, and the idea was first put into practice in America. While being an excellent reagent for the purpose, tetraethyl lead has the disadvantage of being poisonous. Petrol containing it was sold on a commercial scale in the U.S.A., but has now been prohibited, it is understood, following a serious poisoning accident that resulted in the death of several men at the Bayway factory of the Standard Oil Co. in New Jersey. But the valuable technical properties of tetraethyl lead have induced further research on its poisoning properties, which were discussed in Midgley's paper reported in THE CHEMICAL AGE of August 22 (Vol. XIII, p. 197).

Patent Processes

The use of tetraethyl lead as anti-knock reagent is protected by patent (British Patent 196,237) taken out by Midgley on June 23, 1922, on behalf of the Genera lMotor Research Corporation, of Dayton, Ohio. It is couched in broad terms, covering the use of various metallic compounds, but primarily alkyl and phenyl compounds of lead, soluble in petrol, kerosene (burning oil), and other liquid hydrocarbons. By mixing 1 volume of tetraethyl lead to 399 of petrol, the critical pressure is raised from 75 to 160 lb. Other compounds with analogous effect are: the methyl, isopropyl, and triethyl-hydroxy derivatives of lead, lead acetate, lead oleate, and the alkyl and phenyl compounds of selenium, tellurium, tin, arsenic, antimony, and other metals of the IV and VI groups of the periodic classification.

Certain disadvantages are, however, associated with the use of tetraethyl lead, according to a further patent (British Patent 224,102) dated December 1, 1923, also taken out by the General Motor Research Corporation, in the name of A. E. White. It appears that the lead passes from the oxidised state and attacks the metallic parts of the motor. To prevent this, in addition to the tetraethyl lead, another compound which will react with the lead oxide is mixed with the petrol. Halogen compounds are used for this purpose, such as carbon tetrachloride, amyl chloride, hexyl chloride, ethyl chloride, benzoyl chloride; chlorine derivatives of toluene, xylene, cymene, and naphtalene; ketones, aldehydes, oils, chloral, alkyl chloral, the hydrate of chloral, and dichlorpropane. For example, 2 gr. of carbon tetrachloride are mixed with 3 gr. of tetraethyl or tetramethyl lead and added to one gallon of petrol or kerosene.

Instead of these "anti-knock" mixtures a lead compound containing halogens linked with alkyl or aryl groups can be employed, according to this patent, for example, lead diphenyl bromide, lead diphenyl di-iodide, and lead triethyl chloride, bromide, or iodide. In practice, tetraethyl lead dissolved in an alkyl bromide, termed ethyl dibromide, is incorporated in the petrol, the resulting solution being known as "ethyl fluid." The probable function of the ethyl dibromide is also described in the patent. It further augments the stability of the lead liberated and permits it to escape more readily with the gas.

Further, as will be seen later, certain organic derivatives of bromine—and especially ethyl bromide—are probably also employed in the manufacture of tetraethyl lead. The demand for bromine for this purpose has considerably raised its price, and in order to have bromine at their disposal for the preparation of this compound the Ethyl Gasoline Corporation of New York has fitted out a ship carrying a plant for the extraction of bromine from sea water. (See THE CHEMICAL AGE, Vol. XII, p. 348.)

Preparation and Properties

Tetraethyl lead, $Pb(C_2H_5)_4$, is an oily, colourless liquid that cannot be distilled at atmospheric pressure, its boiling point at 190 mm. being 152° C. Its density is 1·62. It combines with hydrochloric acid, forming triethyl lead chloride, $Pb(C_2H_5)_3Cl$, at the same time giving methane. Tetraethyl lead forms a metallo-organic base, the oxide of triethyl lead. Tetraethyl lead is soluble in ether, chloroform and the hydrocarbons, and evaporates in air, being readily oxidised. There are several methods of preparing it. According to Pfeiffer and Truskier, ethyl iodide is allowed to react with lead chloride in ethereal solution in presence of magnesium, while another method consists in converting lead chloride into lead tetrachloride by the agency of chlorine, this then being made to react on ethyl chloride in the presence of sodium:

$$PbCl_4 + 4C_2H_5Cl + 8Na \rightarrow 8NaCl + Pb(C_2H_5)_4.$$

Jolibois and Normand prepare tetraethyl lead by making lead chloride and ethyl magnesium iodide react together and then distilling the product *in vacuo*. The reaction may be represented by the following equation:—

$$2PbCl_2 + 4C_2H_5MgI \rightarrow Pb(C_2H_5)_4 + Pb + 4MgClI.$$

This appears to take place in two stages:—

$$PbCl_2 + 2C_2H_5MgI \rightarrow Pb(C_2H_5)_2 + 2MgClI$$

The diethyl lead is then decomposed by distillation into tetraethyl lead and metallic lead:—

$$2Pb(C_2H_5)_2 \rightarrow Pb(C_2H_5)_4 + Pb$$

A new method of preparing organic compounds of lead is advanced in British Patent 216,083 (The General Motor Corporation, Midgley, August 14, 1922). Metallic lead is made to react with alkyl or aryl halogens in presence of a reducing agent, and preferably, also, of a catalyst. It then forms dialkyl or diaryl compounds of lead, which decompose into metallic lead and tetra-alkyls and tetra-aryls. The following materials may be used as reducing agents:—silicon; ferrosilicon, sodium, or zinc, and a liquid with which these metals give nascent hydrogen, such as water, alkaline lye, and, in some circumstances, ethyl acetate. Reduction can also be brought about electrolytically.

The catalysts employed are usually those of the Griguard reaction, viz.—ethers, primary, secondary and tertiary amines, as well as their addition compounds with alkaline halides. The following substances are in particular mentioned in this patent: aniline, methylaniline, diethylaniline, toluidine, and diphenylamine; phenylenediamine, triethylamine, butylamine, amylamine, pyridine, piperidine, carbazole, phenylhydrazine, triethyl phenyl ammonium iodide, acetamide, ethyl ether, ammonia and quinoline.

The procedure is, for example, as follows:—An alloy of sodium and lead of the composition Na_4Pb is treated with ethyl bromide, and water is gradually added. The tetraethyl

lead formed is isolated by distillation in water vapour. Ethyl bromide can be replaced by methyl, ethyl, propyl, isopropyl, amyl, phenyl, etc., bromides, iodides or chlorides. The reaction may be carried out under pressure.

Theory of "Anti-Knock" Reagents

The specific effect of these reagents has led to research on the theory of their action, which tends to throw light on the details of the process.

P. Jolibois and G. Normand explain the action of tetraethyl lead by suggesting that the explosion of petrol vapour and air is brought about by the presence of a body of slight radius of curvature, such as dust, and "live points," experiments showing that sharp edges will produce this effect. When heated to about 400° C. tetraethyl lead decomposes, giving metallic lead in very minute droplets. These deposit themselves for preference on the incandescent particles, so modifying the radius of curvature and diminishing their catalytic effect. Thus, when a nail was introduced into tetraethyl lead vapour at 400° C., it was observed that lead was mostly deposited on the point.

Another view is taken by G. L. Wendt and F. V. Grimm. Tetraethyl lead added to petrol in the proportion of 1 part in 200,000 exercises a negative catalytic effect on the propagation of the explosive wave produced in the mixture of air and petrol vapour. The flame engendered is, like all flame, greatly ionised—*i.e.*, it contains particles electrically charged by electrons and free electrons. The motion of these ionises adjacent particles in the gas mixture and the explosion travels in this way from one to the next. According to these authors the finely divided lead, formed by decomposition of the tetraethyl lead, attracts the electrons, which become negatively charged and neutralise simultaneously the hydrocarbon particles of opposite charge, resulting in a lowering of the degree of ionisation of the mixture. In order to verify this theory, air was ionised by passing it over an electric arc and then it was mixed with benzene vapour. At a certain point the degree of ionisation was lowered, as was evidenced by electric measurements, and, further, on adding tetraethyl lead to benzene a quadrupled fall in ionisation was recorded. Analogous results were obtained with aniline, which is also an "anti-knock" agent.

The Anti-Oxygen Effect

The most extensive theory, however, is that advanced in a paper presented to the Fifth Congress of Industrial Chemistry in Paris, in September, by Moureu and Dufraisse, who connect the "anti-knock" action of various petrol additives with their "anti-oxygen" theory.

These authors have discovered that certain readily oxidisable materials, such as acrolein, are stabilised by minute traces of phenolic substances (notably the polyphenols), as well as by an immense number of other oxidisable compounds. Added to acrolein, in the proportion of 1/20,000 parts, hydroquinone practically prevents all oxidation, and even 1 part in 100,000 exercises a certain retarding action. Since 1922, when this inhibitory action was first described as the "anti-oxygen effect," it has been proved by further research that this is not an isolated case, but a phenomenon capable of application to a wide range of oxidation reactions. Various theories have been advanced to explain it, and in 1923 Moureu and Dufraisse suggested that a series of related reactions occurred between the oxidisable body, the stabilising agent and the oxygen, which, taking place at an enormous speed, even at ordinary temperatures, regenerate the oxidisable material and the stabiliser, and liberate the oxygen temporarily fixed. In this series of reactions a decisive part is played by the intermediate formation of peroxide materials.

If A is the oxidisable body (*e.g.*, acrolein) and B the stabiliser (*e.g.*, hydroquinone), according to these authors, the following reactions take place :—

$$A+O_2 \rightarrow A(O_2)$$
$$A(O_2)+B \rightarrow A(O)+B(O)$$
$$A(O)+B(O) \rightarrow A+B+O_2$$

In these equations, $A(O_2)$ represents a primary peroxide (a combination of one molecule of oxygen with a molecule of the readily oxidisable body), A(O) a peroxide of an inferior order, and B(O) also a peroxide. These two peroxides are not able to co-exist but react instantaneously, regenerating the original substances. Under certain conditions, however, which are probably of a physical order, the reactions are able to take another course, the peroxide formed—B(O)—reacting not with A(O) but with A. In this case, the following takes place :—

$$B(O)+A \rightarrow B+A(O) \rightarrow \text{stable AO},$$

for, the oxidation of A not being prevented, A(O) passes at once to the state of the stable oxide. In this case B exercises a "pro-oxygen" effect, and if the first of these equations represents a negative catalysis, the second corresponds to an ordinary or positive catalysis.

According to Moureu and Dufraisse, the theory of "anti-knock" substances borders upon the wider theory of "anti-oxygens." The retarding effect exercised on the oxidation of petrol by anti-knock agents lowers its ignition point and so permits it to attain greater compressions without explosion. In some special experiments it was found that tetraethyl lead is an anti-oxygen agent with respect to benzoic aldehyde. The question, however, is whether, in petrol composed principally of saturated paraffin hydrocarbons, peroxides can exist as intermediate products in the reaction. To this objection the authors reply that even at high temperatures paraffin becomes oxidised and gives fatty acids.

To summarise, Moureu and Dufraisse do not pretend to give an exact formula for anti-knock substances, but rather indicate the lines on which research should be conducted, and it is to be hoped that the many experiments now being undertaken will lead to a solution of this economically important problem of "anti-knock" addition reagents for petroleum.

Chemical Societies

To the Editor of THE CHEMICAL AGE.

SIR, — To amalgamate all the various chemical organisations to form one representative body is now generally admitted to be quite impracticable. Each does its own particular work in its own specialised branch of chemistry, and provides a place where all interested in that branch can meet and compare views; and no one society could possibly cater for all branches or cope with so varied a programme as would be presented by an amalgamation of all the existing institutions. The present system is self-evidently good and efficient as far as it goes, and it should be easy to make some small rearrangement which would enable it to present a united, representative front for the chemical profession, such as is urgently needed.

If an arrangement were arrived at so that by paying a certain subscription, a chemist would in return be recognised as a member of all the societies involved, with access to all their reference libraries, and liberty to attend the meetings of all if he liked, the difficulties would be practically overcome. That subscription should go partly towards maintaining a committee of representatives of all the existing societies, and partly to the one or two societies in which the subscriber was particularly interested, and whose publications he would receive. At present, anyone can belong to all the chemical organisations and receive all their publications—containing abstracts from each other—provided he is prepared to pay the subscriptions, which would aggregate an absurd amount, and the literature and privileges received would overlap enormously. Further, no one with any work to do could spare time to attend to all their meetings or wade through all their literature. Rearranged as above, all chemists would have that same super abundance of privileges available for a single subscription which, calculated to keep the aggregate income of all the societies unchanged, could scarcely work out at more than twice, or three times, the subscription of one of them; and in addition, the union required would be obtained without any disorganisation of present arrangements.

It is to be doubted whether there are more than a very few who have either the time or the inclination to belong usefully to more than, at the outside, three or four of the existing organisations, although there may be many who, at times, want information outside their own particular society which is not at present easily accessible, because they do not belong to the society which deals specially with that subject. Under the above scheme they would get what they wanted without difficulty, to the detriment of no one and possibly to the advantage of the world at large.—Yours etc.,

D. H. S. FORBES.

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Some Industrial Applications of the Colloid Mill

By F. J. E. China, B.Sc.(Lond.), A.I.C.

WITH the marked advance in recent years in the study of the chemistry of colloids there has been a notable development in disintegrating and emulsifying apparatus for the reduction of matter to the finest possible colloidal condition. The term "colloidal" has consequently ceased to have an exclusively laboratory significance, and has passed into recognised industrial use. Where, however, what is now known as a "colloid" mill is installed for industrial use a word

21 IN. DIRECT DRIVE PREMIER MILL.

of warning is necessary regarding the possible results to be obtained. The problems to be solved vary greatly with the matter dealt with and the purposes for which it has to be treated, and it is essential for success that every problem should be thoroughly investigated. Very seldom in the case of a "colloid" mill is the desired result obtained at the end of one or two short trials. No two emulsions are alike or behave alike in the course of their manufacture, and every day something new is being learned about them. In many cases considerable work requires to be done before the desired result is obtained, and as in most cases there is both a chemical side as well as a mechanical side to the problem, failure must not be admitted until considerable work has been carried out.

The extent to which colloidal treatment of matter by mechanical means is now the accepted industrial practice may be illustrated by the following notes on one type of colloid mill. The Premier Mill has now been on the market for some three years, during which time it has been introduced into almost every country in the world. Its construction is fairly well known, but it might perhaps be well to recall the general principles.

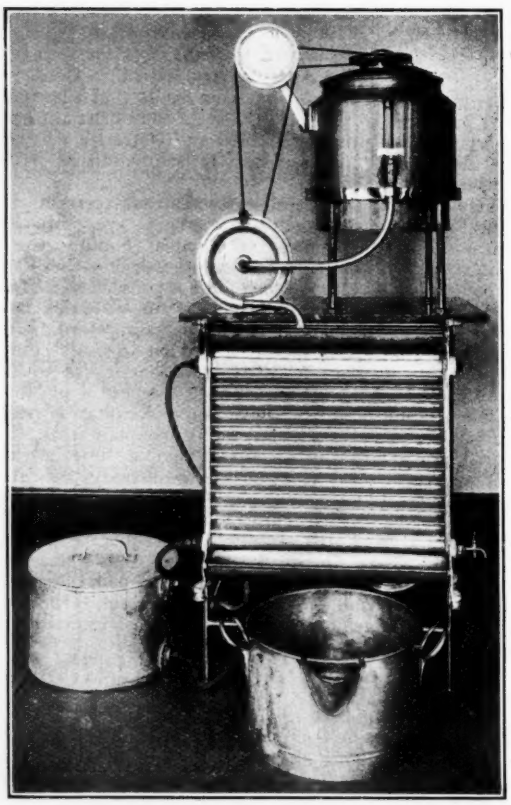
The Premier Mill was the first type of mill to make use of the hydraulic forces that are brought into play in a thin film of liquid when the confines of the film are moved at a very high speed relative to each other. It consists essentially of a cone working in close proximity to another cone. The two surfaces are very finely machined and ground, and under working conditions the rotating member is only a few thousandths of an inch away from the stationary member. This working distance is adjustable and is varied to suit the materials being worked upon.

The speed at which the rotor is run depends upon the size of the rotor, and for the standard type of mill with a 15 inch rotor this speed is usually in the neighbourhood of 3,500 r.p.m., but in special cases is as high as 5,000 r.p.m. In the smaller models the speeds run correspondingly high in order to produce the same peripheral speed as in the Standard Mill. The largest mill in standard practice has a 21 inch rotor, and this is sometimes driven with a steam turbine at 5,000 r.p.m.

The small machine known hitherto as the laboratory model, has a 5 inch rotor, and for general work is caused to rotate at 12,500 r.p.m. In order that price may not prevent even the smallest laboratory from having a Premier Mill, a new model is shortly to be brought out having a very small rotor, run at a very high speed. The drive is arranged so that this mill can be driven from almost any small motor in the laboratory. This model is regarded as especially suitable for emulsion research, and will be marketed in the neighbourhood of £10.

The field of operation of the Premier Mill is a very large one, covering some 40 or 50 different industries. In the emulsion field it has made great strides, largely because the manufacture and use of emulsions has been held up hitherto owing to there being no satisfactory commercial method of making emulsions. In the past, emulsions have been made by the use of large quantities of stabiliser. To-day, difficult emulsions such as heavy tar, solid bitumen, waxes, etc., can be made with 2 per cent. to 3 per cent. of stabiliser only. The use of tar and bitumen emulsions for road work has greatly advanced in the hands of Burt, Boulton and Haywood, Ltd., who are well-known as tar distillers in many parts of the world.

Plants for the manufacture of tar and bitumen emulsions are

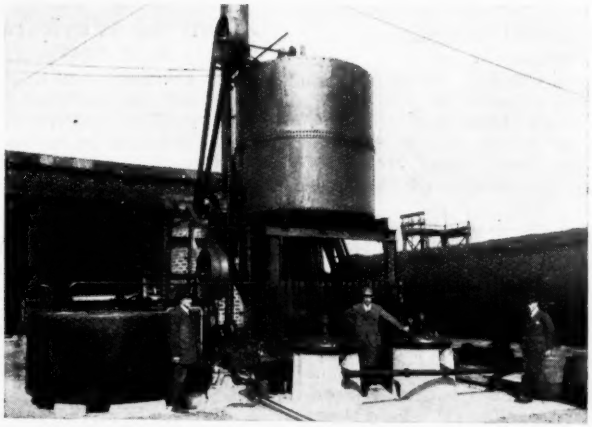


COMPLETE UNIT FOR THE REGENERATION OF MILK AND CREAM.

being erected, or are already running, in many parts of Great Britain, France, Belgium, Spain, the United States, Australia, New Zealand, South Africa, and India, and further fields are being investigated. The problem of making satisfactory emulsions, which would give results able to compete with the existing methods of applying tar and bitumen, has been a very difficult one, but has been made possible at last, many thousands of tons of material having been laid on some of the most important roads.

Another field where the Premier Mill has been of service in cheapening the manufacture and in producing a better product has been in the manufacture of such materials as shoe polishes, furniture creams, printing ink, etc. In some cases the texture of the products is entirely different from that which had been made hitherto by existing methods. The machines are extensively used in the pharmaceutical industry. As can be well imagined, they are extremely useful in the preparation of the numerous products required for public use.

The manufacture of certain paints and enamels is another field in which the mill has met with considerable success. In the automobile industry, the finished enamels used for spraying bodywork are passed through the mill immediately prior to use, as it is found that the settling of the particles in many enamels causes a very slight streakiness of the finished panels of the motor car bodies.



PREMIER EMULSION PLANT PRODUCING 4,000 GALLONS BITUMEN EMULSION PER HOUR.

The very large output of the Premier Mill makes it possible to use it for the washing of vegetable oils during both the refining and the subsequent washings. In this and in similar work it should be noted that the output of a standard machine is upwards of 1,500 gallons per hour, with a power consumption of 10 to 12 kilowatts.

There is no necessity to go into all the applications of the Premier Mill, because such matters can be best discussed with the makers. The model, however, known as the laboratory unit is regarded as a particularly useful piece of research plant. There is hardly an industry in which the colloid mill cannot be used with advantage, and the installation of a small laboratory unit enables the works chemist to try out his own ideas. The company, of course, are willing to carry out any demonstration free of charge and to give advice wherever possible.

Low Temperature Carbonisation

To the Editor of THE CHEMICAL AGE.

SIR,—In view of certain recent happenings and the urgent importance of more scientific and economical methods for the use of coal in Great Britain, I suggest that it is high time there was formed an Institution or Association of Fuel Technology, to include specifically low temperature carbonisation, using the term in its broadest sense, and that a preliminary conference be held in London of the very large number of people interested in the matter.

The general public, including many chemists and chemical engineers, have been hoodwinked long enough over this question of the proper utilisation of our valuable coal resources, especially the home production of oils and also of free burning smokeless fuel, and after all our pioneer work we are now in danger of being left behind by the remarkable advances in Germany on the subject, which are in many cases equally applicable to bituminous coal as to the German brown coals.

I have myself the details of over 120 processes for the scientific treatment of raw fuel, and few people realise the amazing amount of work that has been done on this matter in Great Britain, the United States, Canada, Germany, France, Holland, Scandinavia, Austria, and Japan, while important investigations are now to commence in Spain, Chile and Russia, the Soviet Government having established an important thermo-technical institute in Moscow.

In Germany, for example, we have now the "Fellner-Ziegler," "Thyssen," and "Kohlenscheidungs Gesellschaft" processes, all of which have had long continued and large scale experience. In addition to these, of the greatest interest are the "Delkeskamp," "Raffloer," "Dobbelstein," and the "Meguin" processes, besides the work of Julius Pintsch of Berlin and the very valuable investigations in connection with the utilisation of brown coal, particularly by Seidenschnur, Lurgi A. G. Limburg, "Kohlenveredulungs A.G.," "Streppel," and the "Deutsche Erdoel A.G." Then, again, there are the processes of epoch-making importance with which everybody is familiar—the work of Bergius in connection with hydrogenation, and the "Synthol" method for the production of liquid fuels.

The day for burning valuable raw coal as mere fuel is passing fast, and the hundreds of influential people in Great Britain interested, whether technically or otherwise, should unite together without any further delay and push the matter along, especially as our country with its rich bituminous coal, relatively small distances of travel, absence of home oil supply, limited water power, and open fires is the most suitable in the world for the application of such methods.—Yours, etc.,

DAVID BROWNLIE.

46, Grange Road, Ealing, W.5,
November 30.

Elimination of Oil from Water

To the Editor of THE CHEMICAL AGE.

SIR,—I can bear out the testimony of "Engineer" as to the value of clarifying water containing emulsified oil by the addition of small quantities of aluminium sulphate and soda. I put such a plant into operation at the Appleby Iron Co., Frodingham, as long ago as 1908, and it gave perfect satisfaction. The plant consisted only of a large sand filter and a tank which caught the condensed water and to which the reagents were added.

In case a water is required which contains no alkali salt, barium hydrate may be used instead of soda to precipitate the alumina, there being thus formed the two insoluble products, barium sulphate and aluminium hydrate. Precipitated barium carbonate could probably be substituted for the more expensive hydrate.

The same process may be adopted by analysts to estimate oil in water where the oil is in an emulsified condition. All that is necessary is to dry the alumina precipitate containing the oil and extract with ether.

In conclusion, there is not the slightest reason why engineers should be troubled by the presence of emulsified oil in boiler feed water.—Yours, etc.,

W. GREGORY.

50, Crooms Hill, Greenwich, S.E.10.
December 1.

Hodgkinson Salt-making Process

A SOUTH African firm is anxious to obtain information respecting the Hodgkinson Patent Salt-making Process. The name of the inquirer may be obtained on application to THE CHEMICAL AGE.

Society of Glass Technology

Properties of Sillimanite

A MEETING of the Society of Glass Technology was held in the Coal, Gas, and Fuel Industries Department, The University, Leeds, on Wednesday, November 18, with Mr. F. G. Clark, Vice-President, in the chair. Four papers were presented.

In "Notes on Some Old Yorkshire Glasshouses" Mr. W. R. Barker supplemented the investigations of Mr. Joseph Kenworthy and Mr. Francis Buckley.

Mr. H. S. Houldsworth, M.Sc., read a paper on "Some Properties of Sillimanite Bricks and Kaolin-Sillimanite mixtures," in which he showed that the addition of sillimanite to fireclay or kaolin decreased the drying and firing shrinkages and increased the porosity as well as the refractoriness of the mixtures containing fireclay. Kaolin was more resistant to the solvent action of a soda-lime glass than were kaolin-sillimanite mixtures containing less than 60 per cent. of sillimanite. The best results were obtained with test pieces made from a mixture of 66⅔ per cent. of sillimanite and 33⅓ per cent. of kaolin. The reversible thermal expansion of kaolin-sillimanite mixtures was regular and did not vary appreciably with variations in the percentage of sillimanite present. Some tests on commercial sillimanite bricks were also discussed.

Tests of Glass Melting Pots

The third paper presented was "Some Experiments with Sillimanite Pots for Glass Melting," by A. Cousen, M.Sc., S. English, D.Sc., and Professor W. E. S. Turner, D.Sc., which stated that, from the point of view of the glass manufacturer, the question of resistance to corrosion by glass was generally regarded as more important than any other. Experiments were made in which glass batch was melted in pots under specified conditions, and determinations of the alumina and ferric oxide in the glass were used as a measure of the extensiveness of corrosion. The experiments were carried out on two scales: (1) with small pots holding about a pound of glass; and (2) with pots holding about 30 pounds of glass, and tested under continuous running conditions. In the case of small pots, two series of glasses were employed, namely, a soda-lime-silica glass, and a potash-lead oxide-silica glass, both of compositions similar to those widely employed in commerce. With the former series the main conclusion to be drawn was that the glass melted in sillimanite pots contained distinctly less iron oxide than when melted in ordinary fireclay pots. For the potash-lead oxide glasses, the results were similar to those for the soda-lime glasses, the best results being obtained with fine sillimanite, or mixtures containing a preponderance of fine sillimanite. Here also, the colour of the glasses melted in sillimanite pots was not so marked as when melted in fireclay pots. The results obtained with the small pots were sufficiently assuring to warrant the preparation of larger pots: 30 per cent. ball clay with 70 per cent. sillimanite was adopted as the standard mixture. The sillimanite mixtures did not work up so easily as ordinary clay mixtures. Shrinkage from the drying state was very small; in fact, almost negligible, even after firing at a temperature of 1,500° C. in the interior of the top of the pot. It was found that a pot could have its temperature reduced at the week-end to 600° C. and be raised again on the Monday to melting value without appreciable harm. A number of meltings of glasses of various kinds were made; 24 meltings in one pot and 20 in another. The general results confirmed those carried out on the smaller scale, the iron oxide content of the glasses being considerably lower than would be expected from fireclay pots.

Mr. Percival Marson dealt with the causes for shot-holes forming in the lower angle at the bottom of glass house pots. The hole, no more than ¾ inch in diameter, took a course diagonally downwards through the very thickest portion of the pot, whilst the remainder of the pot was quite sound. It was eventually found that the batch of clay used for making these pots had been made too soon after wetting up. The plasticity of the clay not being fully developed, the layers of clay, even under the best efforts of the pot maker, failed to unite under the usual pressure of his hand, and this left boundaries along which glass might subsequently find its way. Owing to lack of time, two other papers were taken as read, namely, "Note on a Design for a Glass Pot-Board," by Francis Winks, M.Sc. (Tech.), and "The Design of Tank Furnaces—A Criticism and Some Suggestions," by H. W. Howes, M.Sc. (Tech.).

Chemical Workers' Grades and Wages

Joint Conference on New Proposals

DURING the week-end a conference was held in London between the Drug and Fine Chemical Manufacturers' Association and the National Drug and Chemical Union to consider the following proposals by the Union to revise conditions laid down in the standard agreement covering the industry affecting roughly 15,000 workers:—

CLAUSE 2. OVERTIME.—We desire this clause to be amended so as to provide that any hours worked by workers, other than shift workers at any time between 12 midnight and starting time next morning, shall be paid at the rate of time and a half.

CLAUSE 3. HOLIDAYS.—We wish this clause to be modified so as to give twelve days instead of six for twelve months' service, and one day instead of half a day for each completed month's service for any shorter period of employment. We further wish that a clause be inserted that, wherever a worker leaves employment for any other reason than for misconduct before the time when his holidays may be due, he shall receive payment in lieu of the holidays which he would otherwise have taken.

CLAUSE 4. RATES OF WAGES.—We desire the inclusion of departmental foremen and forewomen, deputy foremen and charge hands (male and female), and ask that the following minimum rates shall operate:—Foremen, 20s. above grade rates; forewomen, 10s.; deputy foremen, 10s.; male charge hands, 7s. 6d.; female charge hands, 5s. We further ask that foremen and forewomen be entitled to twelve working days' holiday per year, and charge hands nine days.

RE-GRADING OF PACKERS.—We ask that packers for transport be transferred from grade 2 to grade 1.

Amendment of Definitions

We wish the former three of the following definitions to be inserted, and the remainder to be amended as under:—

1. DEPARTMENTAL FOREMEN AND FOREWOMEN.—A departmental foreman or forewoman is one in charge of a department or group of workers and is directly responsible to the management for the control of the workpeople under his or her charge.

2. DEPUTY FOREMEN.—A deputy foreman is one held responsible by the management for temporarily carrying out the duties of a foreman.

3. CHARGE HANDS.—A charge hand is one in charge of a number of workers acting under the direction of a foreman or forewoman and is actively engaged in the work.

4. PROCESS WORKERS.—A chemical process worker is one who, working under a foreman or qualified chemist, is employed in the production of chemicals or chemical compounds. A galenical process worker is one who, working under a foreman or qualified chemist, is employed in the production of galenicals, *i.e.*, medicinal preparations.

5. COUNTERMEN, 1ST CLASS.—First-class countermen are workers engaged in and responsible for executing without direct supervision other than that of a foreman: (1) Mixed orders for miscellaneous lines; (2) or scheduled poisons; (3) or dealing with substances which in the opinion of the firm, either owing to their nature or expense, require extra care in handling and are dealt with in a department, or at a counter set apart for scheduled poisons.

6. COUNTERMEN, 2ND CLASS.—Second class countermen are workers engaged in but not responsible for weighing and filling drugs and chemicals (excluding scheduled poisons) under direct supervision other than that of a foreman.

7. LABOURERS.—Those workers engaged in loading, unloading, and haulage work.

Brunner, Mond and Co. Offer More Rates

AT a meeting of the Board of Guardians at Sandbach on Friday, November 27, a letter was read from Brunner, Mond and Co., Ltd., stating that they were of opinion that their Sandbach works were under-assessed for rating purposes. They had made certain calculations and were prepared to increase the assessment to £9,900.

The Clerk said that that was what they called honesty, and the chairman said that it was a very handsome letter and the committee would send a suitable acknowledgment. The letter occasioned great surprise among members.

Determination of Sulphur in Petroleum

A New and Rapid Method

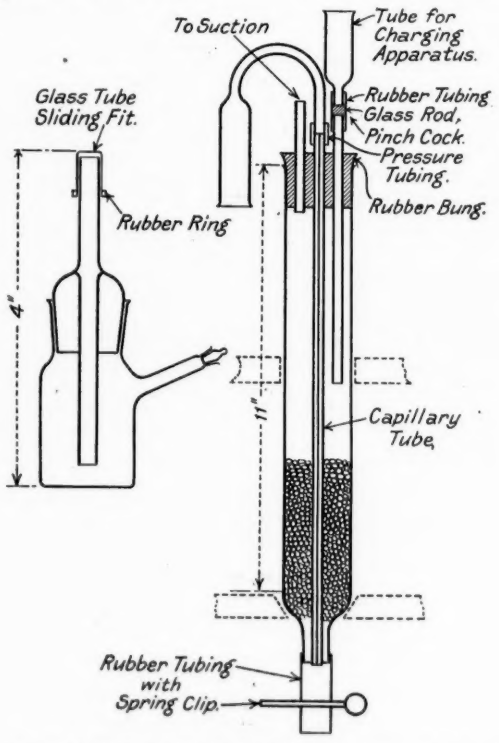
At the joint meeting of the South Wales sections of the Institute of Chemistry and the Society of Chemical Industry, held at Swansea on Friday, November 27, "A New Method for the Determination of Sulphur in certain Petroleum Products" was the subject of a paper by Mr. E. S. Squire.

The bomb, lamp gravimetric and lamp volumetric methods were discussed and an improved apparatus and procedure described for the lamp volumetric method. A modified Esling absorption bulb is used in which one limb of the "U" tube is 8 in. long, at the bottom of which is held a perforated porcelain disc. This limb is half-filled with glass spheres ¼ in. in diameter. A small sliding tube outside the top of the wick holder is used to regulate the size of the flame. The titration is carried out with a rapid current of air passing through the solution, using methyl red as an indicator. Under these conditions a perfectly sharp end point is obtained with one drop of N/16 sulphuric acid.

The desirability of a much more rapid method was emphasised and a method described by means of which sulphur in oils can be estimated in 10 to 40 minutes. The apparatus used is shown in the accompanying diagram. This is seen to be simple and can be washed out without dismantling any part. The chimney has been shown to retain only negligible quantities of sulphur.

Method of Procedure

The solutions used are as follows :—(1) For sulphur contents between 0·05 and 0·25 per cent. : N/160 sodium carbonate



solution, each litre of which contains 3·5 gm. of potassium iodate and 25·0 gm. of potassium iodide. (2) For sulphur contents above 0·25 per cent. : N/80 sodium carbonate solution, each litre containing 5·28 gm. of potassium iodate and 37·7 gm. of potassium iodide.

10 cc. of the standard solution are measured into the absorption tube from a pipette, 1 cc. of starch solution and 35 cc. of distilled water added. The water should be neutral to methyl red and be measured to within 1 cc. A lamp containing the oil is weighed, placed under the chimney and ignited with a lighted wax taper. The flame is adjusted for light oils to a height of 12–15 mm., and the current of air regulated to the minimum rate that will maintain a clear non-smoking flame. With heavy oils this height flame cannot be maintained, a flame of about 4–7 mm. being then employed. Burning is continued until the end point is reached, which is indicated by the sudden appearance of the well-known starch iodide colour. The flame is immediately extinguished and the loss in weight of oil taken. The sulphur content can then be obtained, (*a*) for values below 0·25 per cent. with solution (1), from a curve ; (*b*) above 0·25 per cent. with solution (2), by calculation : 10 cc. of this solution = ·002 gm. sulphur.

The graph is necessary for values below 0·25 per cent. sulphur, because the appearance of the blue colouration does not quite coincide with the neutralisation of the sodium carbonate. The theoretical aspects of this phenomenon were discussed and explained graphically. The co-ordinates of the curve are as follows :—

Weight of oil burnt. *Grams.*	Sulphur content. *Per cent.*
0·450	0·25
0·465	0·24
0·490	0·22
0·527	0·20
0·580	0·18
0·646	0·16
0·725	0·14
0·812	0·12
0·930	0·10
1·130	0·08
1·290	0·07
1·520	0·06
1·760	0·05

If the method is to be used for oils other than petroleum products, the sulphur content of which lies between these values, the author recommended that a curve be standardised under the conditions of working.

Chemical Matters in Parliament

Accidents in Chemical Works

Colonel Day (House of Commons, November 26) asked the Home Secretary what was the penalty for a breach of Regulation 7 in the case of chemical works ; whether any prosecution took place in respect of the two gassing accidents resulting in the loss of life mentioned in the Report of the Chief Inspector of Factories for 1924 ; and, if so, what was the result.

Sir W. Joynson-Hicks said that if the breach was committed by the occupier, owner, or manager, the penalty was a fine not exceeding £10, or, in the case of a continuing offence, not exceeding £2 for every day after conviction. Where a breach by the occupier resulted in the death or injury of any person, he was liable to a penalty not exceeding £100. Where the contravention was committed by a workman or other such person, the penalty was a fine not exceeding £2. No prosecution took place in the two cases mentioned, because it was considered that the object of the Regulation could be better attained by taking up the question with the representative associations of employers in the industry. This had now been done, and these associations had now circulated their members emphasising the necessity for a thorough compliance with requirements, and indicating the most appropriate measures to be taken.

Oxygen Gas Supplies

Captain King (House of Commons, November 26), in reply to Mr. Gillett, said that it would be much more costly to obtain supplies of oxygen gas for the Army from the supplies manufactured at the Navy yards instead of from the trade as was done at present.

Low-temperature Carbonisation

Colonel Lane-Fox (House of Commons, December 1), in reply to Mr. Smithers, said that the members of the Royal Commission at their recent visit to the Fuel Research Station, were shown all plant and the work in progress, and this included the experimental retorts for low-temperature carbonisation. He also said that there were some facilities at the station for experimenting in the making of briquettes, but no systematic examination of briquetting processes had been carried out. The work done had been ancillary to other investigations, and had been described in the report of the Fuel Research Board for the period ended December 31, 1924.

From Week to Week

COURTAULDS, LTD., are to erect a new factory at Fontinettes, Calais, to cover nearly 400 acres.

MR. THOMAS BUXTON, formerly Canadian manager for the British Dyestuffs Corporation, has now joined the National Aniline and Chemical Co., Ltd., Toronto.

A TREASURY GUARANTEE OF £865,000 under the Trade Facilities Act has been granted to the Second Anglo-Scottish Beet Sugar Corporation, Ltd., for the erection and equipment of factories.

AN EXPLOSION in a cylinder of crude oil used as fuel at the North Tees power station was followed by an extensive fire in which 500,000 galls. of oil were burned on Thursday, November 26.

SIR ALFRED MOND has purchased the Ystradwrallt estate in the Carmarthenshire division of which he is Parliamentary representative. The mansion is in excellent condition and the land is some of the richest in the Towy Valley. The price is not disclosed.

A PRESENTATION OF LONG SERVICE MEDALS was made to the members of the Castner-Kellner fire brigade by Mr. E. O. Glover on behalf of the firm at a social function on Friday, November 27. One medal marked 25 years' service and four others were 20 years' awards.

MR. J. A. NEWCOMBE, formerly of Liverpool University, has been appointed to the staff of the Department of Metallurgy of the University of Toronto. Mr. Newcombe is a graduate of the Royal School of Mines, London, and the London University, and was employed as metallurgist at the Woolwich Arsenal.

UNCUSTOMED SACCHARINE was the subject of a case at Bow Street, on Friday, November 27, when two men were charged with dealing in saccharine on which no duty had been paid. One man was discharged, but James Ramsay, of Hampstead, was stated to have offered the saccharine for sale to a Customs officer at 47s. 6d. per lb., whereas the duty was 3s. 9d. per ounce. He was fined £1,071 (treble value of duty) and the goods seized, or, in default, three months' imprisonment.

NEW PRICES OF CYANAMIDE are announced and is now available at £10 per ton, delivered in 4-ton lots, at any station in Great Britain. This price is for the December delivery. The price for January will be £10 2s., for February £10 4s., and for March/April £10 6s. The calcium cyanamide is sold on a 19 per cent. basis and no charge is made for excess, but an allowance on a sliding scale is made for any deficiency. Prices are net cash, but fertiliser manufacturers and merchants will be granted a special wholesale allowance.

MR. JUSTICE ROMER, in the Chancery Division, on Tuesday sanctioned a petition for the reduction of the capital of Keeling's Oxides (1921), Ltd., from £250,000 to £151,077, by cancelling capital lost or unrepresented by available assets. Mr. Swords, for the company, said the reduction was necessary owing to the company's unsuccessful trading. The whole of the goodwill had disappeared because of these losses, and included in the goodwill were secret processes and trade marks. The goodwill was put at £42,000 in the balance-sheet.

THE EXPORTS OF CHEMICALS from the United States during the first nine months of the year show an increase of 16 per cent. and imports are up by 19 per cent. on the same period for 1924. The figures are $117,775,000 exports and $138,147,000 imports. Trade in industrial chemicals has increased and the demand has strengthened for ammonia and soda compounds, copper sulphate, acid, and glycerine. There was a marked decline in the export of calcium carbide. Fertilisers account for 45 per cent. of the imports, and ammonia sulphate import figures rose from 3,000 tons to 18,900 tons for the period.

FOR SELLING CHEMICAL PRODUCTION SECRETS from the Bayer Co., two men were sentenced at Cologne recently (as reported in THE CHEMICAL AGE of October 17). Now, it is reported, a plot has been discovered which shows that secret processes were being stolen and forwarded to Russian Communists in Berlin. Albert Knopfle, a workman engaged at the Bayer works, and an official of the German Communist Party, has been arrested, and, it is stated, evidence has been found establishing the fact that a definite organisation exists to supply the secrets of manufacturing various patented dyes and drugs to Russian agents.

UNIVERSITY INTELLIGENCE includes the following announcements: London.—A sum of £18,000 is still required for the equipment of the engineering laboratories, and £30,000 is needed for the endowment of the Chair of Civil and Mechanical Engineering. Mr. J. M. Johlin (University College) has been awarded the degree of D.Sc. (Chemistry). Cambridge.—Mr. F. J. Wyeth and Mr. H. H. Down have been awarded the degree of D.Sc. Birmingham.—New buildings of the oil mining department will shortly be inaugurated and the department will deal with questions concerning oils from fuel carbonisation as well as oilfield problems. St. Andrews.—The formal opening of the new Physical and Chemical Laboratories was arranged to take place on Friday and to be performed by Sir William Bragg on whom the honorary degree of LL.D. was to be conferred.

THE WITHDRAWAL OF AMERICAN INTERESTS in the loan to the German Potash Syndicate is reported.

MR. J. RUSSELL THOMBERRY has been elected vice-president of the Oil and Colour Chemists' Association in the place of the late Mr. W. J. Palmer.

LOW TEMPERATURE CARBONISATION, LTD., announce that Mr. Salisbury-Jones (late managing director) has, on account of continued ill-health, been obliged to sever his connection with the company.

A COMPULSORY SETTLEMENT has been ordered by the Minister of Labour of the Reich in the Frankfurt chemical industry because masters and men refused to accept a local arbitration award. Over 31,000 men are involved.

THE FOURTH RAMSAY CHEMICAL DINNER will be held at the Grosvenor Restaurant, Glasgow, on Wednesday, December 9. The function embraces all the local chemical and allied societies, and this year the chair will be taken by Sir Frederic Nathan' president of the Institution of Chemical Engineers.

RECENT WILLS INCLUDE—Joseph Parker, bleacher, of Bury, £48,678 (net personalty, £48,585); Herbert Dynes Ellis, chairman of the Oriental Gas Company, and director of the Commercial Gas Co., £54,196 (net personalty, £51,092); Thomas Armistead Ward, managing director of T. A. Ward and Co., Ltd., manufacturing chemist, Blackburn, £25,070 (net personalty, £24,154).

GIVING EVIDENCE before the Coal Commission on Thursday, November 26, Mr. Charles Merz, consulting electrical engineer, said that in connection with low temperature carbonisation it would pay to tax imported oils and give a rebate on such taxation of oils to oils and petrol produced at home. Unless there was a demand for products, such as motor spirit, people would not invest much capital in the process.

SEVERAL SUGAR BEET DEVELOPMENTS have been recorded. Work is to begin at once on the Barlow airship station which, as already reported, has been purchased by the United Sugar Company. Three Hungarian experts, directors of the company, will take charge of operations. During the season 1,000 tons a day will be pulped and 300 hands employed.—The first Scottish factory has been opened at Greenock by the Orchard Sugar Co.—The European beet sugar crop is now officially estimated at 7,532,000 tons for this year.

THE FOLLOWING OFFICERS WERE ELECTED at the annual meeting of the Institute of Chemistry (Birmingham and Midlands Section), on Wednesday, November 25:—Professor A. R. Ling, chairman in place of Professor G. T. Morgan; vice-chairman, Mr. F. H. Alcock; hon. treasurer, Dr. J. N. Friend; hon. secretary, Mr. C. J. House; committee, Messrs. C. A. F. Hastilow, S. A. Brazier, A. W. Knapp, A. S. Wood, W. Wardlaw, H. T. Pinnock, W. B. Ault, J. R. Johnson, A. Lowe, and C. E. Wood. An address was given by Mr. F. Scholefield, of Manchester, on "Statutory Registration of Chemists."

MR. M. J. CARNEY, formerly president of the Prest-O-Lite Co., Inc., has been elected chairman of the board. Mr. W. F. Barrett, formerly vice-president, has been elected president, and Mr. R. R. Browning vice-president in charge of acetylene sales activities. At the last meeting of the board of the Linde Air Products Company, Mr. G. W. Mead, formerly president, was elected chairman. Mr. W. F. Barrett, formerly vice-president, was elected to the presidency. In addition, Mr. R .R. Browning was elected vice-president in charge of sales activities, and Mr. J. A. Rafferty vice-president in charge of engineering, manufacturing and research.

SPEAKING OF LOW TEMPERATURE CARBONISATION at the annual meeting of the Coke Oven Managers' Association at Birmingham on Thursday, November 26, Mr. H. E. Parkes pointed out that reports had been published about wonderful experiments at Barnsley. Arrangements were made on three occasions for visits to be paid to the works, but each time, a fortnight before the date fixed, the proposed visits were cancelled. It was most curious that a body like theirs, which represented half of the carbonising people in the country, was not allowed to inspect those works. The question of research was receiving full attention from the Coke Oven Managers' Association and the Fuel Research Board was prepared to examine, without prejudice, any scheme put forward.

Obituary

MR. A. C. MILLER, of Alex. Miller, Jun., and Co., paint manufacturers, of Glasgow, on Thursday, November 26.

MR. HARRY CLAYTON, on Wednesday, aged 56, secretary to J. Crosfield and Sons, Ltd., soap and chemical manufacturers, Warrington. In thirty-nine years' service with the firm he rose from a junior clerical position, and was also appointed a director of the Erasmic Co.

ALDERMAN WILLIAM CAIL, of Newcastle, aged 76. He had been analytical chemist at the Walker Alkali Works and afterwards manager of the company. Later he became head of William Cail and Partners, and managing director of Cail Bitmo Co., Ltd. He had done much public work and had a good record as a sportsman, particularly in Rugby football, being for many years one of England's representatives on the International Board.

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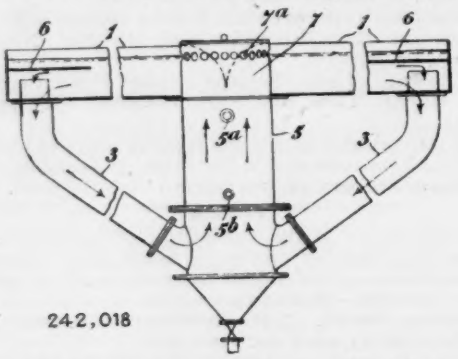
The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

242,018. Evaporation of Salt or other Substances to produce Crystals. R. France, "Highlands," Minshull Vernon, Middlewich, Cheshire. Application date, August 23 and December 19, 1924.

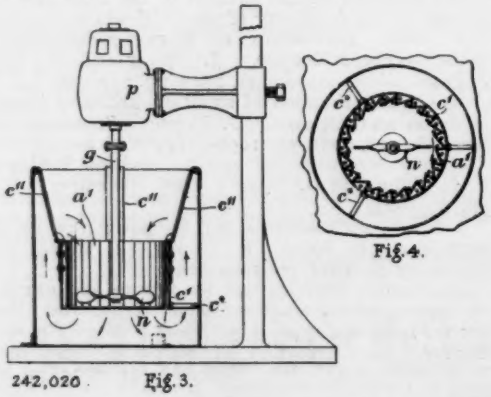
The salt solution is circulated by a pump through a tubular heater and thence through a shallow pan or tank open to the air, where the water or other solvent evaporates and the salt



242,018

crystallises. The solution returns to the pump for circulation again. In some cases, the pump may be dispensed with and circulation is effected by the thermo-syphon system. In an example of the latter system, a tank 1 is connected at both ends with circulation pipes 3, through which the solution passes to the bottom of the heater 5. Steam is supplied to the pipes of this heater through a pipe 5^a and withdrawn through a pipe 5^b. Baffle plates 6 are provided over the inlets of the pipes 3 to prevent the precipitated crystals flowing out of the pan 1. The cylindrical vessel 7 is mounted in the tank 1 above the heater 5, and the heated solution passes out through the perforations 7^a into the tank. In other modifications, the pipes 3 may enter the tank 1 at points adjacent to the heater 5, or the pipes 3 may be replaced by an annular conduit surrounding the heater 5.

242,020. Extraction, Solution and Mixture of Soluble and Insoluble Substances, Apparatus for Use in. N. Bendixen, 13, Ladbroke Square, London, W.11, W. E. McKechnie, 54, Elm Park Gardens, London, S.W.10, and E. L. Reid, Elm Park House, Elm Park Gardens, London, S.W.10. Application dates, August 27 and November 11, 1924.



242,020 Fig. 3.

This apparatus is suitable for the extraction of soluble substances from vegetable and like material, *e.g.*, barks, roots, and gums, and a modified apparatus is used for the solution of soluble substances, and the formation of emulsions and suspensions of oils, fats, etc. The illustration shows an emulsifier comprising an inner vessel a^1 with a serrated periphery preferably formed of wire gauze, and an intermediate vessel c^1 closely surrounding the inner vessel so as to form an annular series of passages. These vessels are supported from an outer vessel by straps c^{11} hooked over the upper edge of the vessel, and distance pieces c^* are provided to hold the inner vessel concentric. A spindle g driven by an electric motor p carries impellers n which are rotable at 500-4,000 revolutions per minute to propel the liquid outwardly and downwardly. A current of liquid enters the passages through the perforations of the wall of the vessel, and the impact on the inner wall of the perforated surface ensures an effective mixture. Thus, a suspended substance such as oil, fat, grease, etc., becomes very finely divided and forms an emulsion with the liquid. The bottom of the inner vessel a^1 is in the form of a grid of wire gauze, and may have radial corrugations or serrations. A modified form of this apparatus is described in which the annular space between the vessel a^1 and c^1 is considerably larger and contains the substance from which an extract is to be made.

Fig. 4.

242,029. Producing Oil Gas in Externally-heated Retorts, Process of and Apparatus for. J. Rude, 4, Cleveland Terrace, W.2. Application date, September 15, 1924.

This apparatus is for producing oil-gas for the enrichment of water-gas in a vertical retort. The fuel, which may be coal or coke, is admitted to the top of a pair of vertical retorts through which it passes downwards, and is distilled or preheated according to the nature of the fuel. In either case the product at the bottom of the retorts is coke, which passes directly into a pair of lower retorts surrounded by heating flues embedded in the walls. Producer gas is burned with preheated air in these flues, and the waste gases are then used to raise and superheat steam. The steam is injected into the hot coke at a number of different levels, and the resulting water gas passes upwards through the upper retorts. The lower ends of the lower retorts are combined into a single chamber into which oil is injected for the formation of oil-gas. The oil-gas is immediately withdrawn into a conduit between the two retorts, and then passes into the upper retorts. The temperature in the flues surrounding the oil-gas making chamber should be kept lower than in the remaining flues.

242,061. Azo Dyes, Manufacture of. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester. K. H. Saunders and H. Goodwin, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, October 22, 1924.

1-amino-2-hydroxy-3-carboxynaphthalene-6-sulphonic acid is produced by sulphonating β-oxynaphthoic acid, coupling the sulpho acids so obtained with diazo-benzene, and reducing the azo compound. This sulphonic acid is diazotised and the diazo compound coupled with a pyrazolone preferably those containing a carboxy group or groups. The resulting dyestuffs are easily soluble and can be printed with a chrome mordant on calico in the usual manner, giving pink to bluish-red shades. Examples are given in which the diazo compound derived from the above acid is coupled with 3^1-carboxy-1-phenyl-3-methyl-5-pyrazolone, 3^1-oxaminophenyl-3-methyl-5-pyrazolone, and 3^1-carboxyphenyl-3-carboxy-5-pyrazolone.

242,092. Separating Phenols from Crude Oils, Methods of. V. L. Oil Processes, Ltd., O. D. Lucas, and E. L. Lomax, Vickers House, Broadway, Westminster, London. Application date, November 24, 1924.

This process is for separating phenols, including cresols, etc., from crude oils obtained from the distillation of coal, lignite, etc. It has been found that if the phenols are neutralised with caustic soda solution of 20 per cent. strength or less, the theoretical equivalent combines with the soda. If a higher strength of caustic soda is employed, the phenols are soluble

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in the sodium phenate formed to an extent depending on the concentration of the caustic soda and the concentration of phenol in the crude oil. The solution of phenol in alkali phenate is then separated from the oil, and diluted with water to reduce the concentration of sodium phenate. The excess of phenol separates out and is withdrawn, and the solution is reconcentrated until the strength of sodium phenate is sufficient for use again in treating the crude oil. If the caustic soda solution is employed at a strength above 30 per cent., some of the neutral oil is taken up by it. In this case the oil is removed by steam distillation, and the remaining solution treated as before.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 226,491 (R. F. Meyerhofer), relating to a process of producing metal compounds, see Vol. XII, p. 185; 232,184 (Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges, et Camargue), relating to apparatus for the manufacture of hydrogen, see Vol. XII, p. 616; 239,173 (Chemische Fabrik Kalk Ges. and H. Oehme), relating to vulcanisation of india-rubber, see Vol. XIII, p. 477.

International Specifications not yet Accepted

240,148. PHOSPHORIC ACID. C. Millberg, 19, Rue J. J. Rousseau, Asnières, Seine, France. International Convention date, September 18, 1924.

Mineral phosphate is dissolved in sulphuric acid, and the solution neutralised with soda. The di-sodium phosphate is then treated with an insoluble salt of lead, and an alkali to neutralise the acid liberated. Tri-plumbic phosphate precipitate is separated, washed, and treated with an arsenic-free acid, *e.g.*, sulphuric acid, to liberate phosphoric acid and precipitate the lead, as an insoluble salt. The lead sulphate may be converted into carbonate, which may then be used for treating a further quantity of di-sodium phosphate. The mother liquors resulting in the manufacture of sodium phosphate may be treated for the recovery of sodium sulphate. The phosphoric acid obtained is free from iron and arsenic.

240,170. CRYSTALLISING. Aktieselskapet Krystal, 26, Uranienborgveien, Oslo. International Convention date, September 20, 1924.

A supersaturated solution is passed upwards through small crystals resting on a perforated shelf, to obtain coarsely granular material. To obtain the supersaturated solution, a solution is saturated at a higher temperature, passed through a cooler, and forced by a pump through the small crystals. Ammonium nitrate is crystallised in this manner, the bulk of the liquid being kept below the temperature at which a change in crystalline form takes place.

240,401. LEAD SALTS. Consortium für Nassmetallurgie, Oker, Harz, Germany. International Convention date, September 23, 1924.

Lead is dissolved out from ores, slags, sludges, etc., by acidifying with hydrochloric acid and treating with a strong solution of an alkali or alkaline earth chloride. Iron is then removed by oxidation with air, chlorates, etc., and the silver is precipitated by metallic lead. Lead oxychloride is then precipitated by adding an alkali or alkaline earth oxide or hydroxide, or alkali carbonate, and the liquor is used again. Any desired lead salt can be obtained from the oxychloride by suspending it in water and adding the necessary acid. To obtain lead carbonate, carbon dioxide is passed into the suspension till chlorine ceases to increase in the solution, the precipitate is separated, water added, and again treated with carbon dioxide until the precipitate contains 0·5 per cent. of chlorine. A basic carbonate is obtained, suitable for use as a pigment. Examples of the treatment of lead sludges are given.

240,407. ALDEHYDE-AMINE CONDENSATION PRODUCTS. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. Assignees of S. M. Cadwell, 200, Ames Avenue, Leonia, N.J., U.S.A. International Convention date, September 23, 1924.

Deterioration of vulcanised or unvulcanised rubber is prevented by condensation products obtained from equimolecular proportions of an aliphatic aldehyde and an aromatic amine such as aniline, *o*-, *m*-, or *p*-toluidine, monomethylaniline, or 4-amino-1 : 3-xylene, in strong acid solution. In an example, aqueous solutions of aniline hydrochloride and acetaldehyde are mixed below 25° C., and the acid partly neutralised with caustic soda, or aniline or other aromatic amine. The condensation product is precipitated and filtered.

240,435. ALUMINIUM SULPHATE. L. G. Patrouilleau, and Soc. Anon. Alumine et Dérivés, 2, Cité Monthiers, Paris. International Convention date, September 29, 1924.

Crude aluminium sulphate obtained from bauxite is heated or electrolysed in the presence of iron to obtain nascent ferrous oxide in the solution, which causes the formation of ferrous sulphate and basic aluminium sulphate, and precipitates titanic oxide. Iron electrodes can be used for this purpose, or iron in small particles if the reaction is effected by heating. The solution is poured into water to precipitate basic aluminium sulphate, which is then converted into normal sulphate or alumina.

240,459. DYE PREPARATIONS. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, September 24, 1924.

The process is for obtaining readily soluble, stable dry quinone vat dye preparations from the leuco compounds. The leuco compound of the brown sulphurised vat dyestuff from dianilidodichloroquinone, or of the yellow *p* : *p*-dichlordianilidoquinone, or of the red *p*-chloranilido-naphthoquinone is heated with a free alkali (caustic soda) and a protective colloid such as molasses, sugar, sulphite cellulose lye, dextrin, albumin or the like to 90° C., and then evaporated in vacuo.

240,475. CARBOHYDRATES. R. Römer, 30, Laan Copes van Cattenburch, The Hague, Holland. International Convention date, September 25, 1924.

An increased yield of sugars such as glucose and pentose is obtained from wood, etc., by hydrolysis, by treating the raw material so that the lignin or like substances are loosened, and more cellulose is available for conversion. Sawdust may be mixed with water and 1 per cent. of hydrogen peroxide, and the mixture saturated with chlorine. After standing, chlorine is again passed in till no further increase in weight occurs. The product is washed, and hydrolysed with acid to sugar. Other examples are given.

240,492. DYES. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. International Convention date, September 27, 1924.

1 : 1[1]-dianthraquinonylamine is treated with fuming sulphuric acid, yielding a monosulphonic acid at low temperatures, and the 4 : 4[1]-disulphonic acid at higher temperatures. Wool is dyed from an acid bath in yellow-orange to yellow-brown shades.

240,801. SULPHUR DIOXIDE. Grasselli Chemical Co., 1,300, Guardian Building, Cleveland, Ohio, U.S.A. (Assignees of J. C. Boertlein, 1,300, Guardian Building, Cleveland, Ohio, U.S.A.). International Convention date, October 4, 1924.

Sulphur is employed as fuel in a Diesel engine. The sulphur is melted in a receptacle in the wall of the combustion chamber, and is introduced into the cylinder by superheated steam or by the heat of the combustion gases. The air for combustion is dried, and corrosion is thus avoided. The exhaust gases are passed into a chamber where residual sulphur is oxidised, and the gases are then purified and used for the production of sulphuric acid by the contact process.

240,803. PURIFYING OILS. F. Lavirotte, 50, Chemin de Combe-Blanche, Lyons, France. International Convention date, October 4, 1924.

Petroleum residues and heavy oils are treated with strong sulphuric acid after mixing with a hydrocarbon which is unacted upon by the acid, the temperature being 120°-160° C. The liquid is drawn off and neutralised by agitating with porous clay and calcium carbonate, and filtered hot through porous clay. The residue from the acid treatment is treated with naphtha, benzol, tetrachlorethylene or other solvent of the purified oil, and the solution separated and distilled. The residue is heated to 400° C., ground, and strongly heated in air till about half is consumed, yielding a highly active porous carbon.

240,814. SYNTHETIC DRUGS. H. Rupe, 8, Feierabendstrasse, Basle, Switzerland. International Convention date, October 1, 1924.

The α-cyano derivatives of hydroaromatic ketones such as camphor, menthone, thujone, pulegone, and cyclohexanone

are reduced with hydrogen in the presence of a nickel catalyst. The intermediate products are hydrolysed if necessary. In the case of α-cyanocamphor, the hydrogenated product is filtered, the solvent distilled off, and the hydrochloride of methylenecamphor-camphomethylamine precipitated and then hydrolysed. The oxymethylene-camphor obtained as a by-product is removed with ether, and the aqueous solution evaporated to obtain hydrochloride of α-camphomethylamine.

240,834. ALUMINIUM CHLORIDE AND ALUMINA. Chemische Fabrik Griesheim Elektron, 31, Gutleutstrasse, Frankfort-on-Main, Germany. International Convention date, October 2, 1924. Addition to 205,563.

Specification 205,563 (see THE CHEMICAL AGE, Vol. IX, p. 581) describes the treatment of clay with hydrochloric acid, yielding aluminium chloride, which is crystallised and washed with hydrochloric acid to obtain the pure salt. The mother liquor when mixed with more hydrochloric acid and used again becomes too rich in iron chloride, and is then diluted and treated with burnt clay to remove most of the iron. The clay is washed with water to remove the iron hydroxide, and then treated with acid as described above.

LATEST NOTIFICATIONS.

243,338. Process for rendering gelatine insoluble, and its application to various arts. S. de Procoudine Gorsky, and N. Pozniakof. November 19, 1924.

243,356. Process of producing pure aluminium hydrate, particularly from aluminium-containing raw materials rich in silica. E. L. Rinman. November 22, 1924.

243,368. Process and apparatus for the dehydration of impure ethylic alcohol. Distilleries des Deux-Sèvres. November 20, 1924.

243,383. Coal-tar oil for flotation purposes. Barrett Co. November 22, 1924.

Specifications Accepted with Date of Application

220,304. Condensation products of the anthraquinone series, Manufacture of. Farbwerke vorm. Meister, Lucius and Brüning. August 8, 1923. Addition to 205,502.

221,205. Artificial shellac, Manufacture of. Soc. of Chemical Industry in Basle. August 30, 1923.

222,461. Synthetic production of ammonia from its elements, Apparatus for. A. Woosnam. (*Norsk Hydro-Elektrisk Kvaelstofaktieselskab.*) September 2, 1924.

225,172. Distilling bituminous substances at a low temperature, Process and apparatus for. Kohlenscheidungs Ges. November 24, 1923.

230,855. Anhydrides of disaccharides, Manufacture of. A. Pictet. March 14, 1924.

231,446. Dyestuffs containing chromium, Manufacture of. Soc. of Chemical Industry in Basle. March 28, 1924.

232,178. Cracking of hydrocarbons. Sinclair Refining Co. April 8, 1924.

242,685. Hydrocyanic acid, Manufacture of. Deutsche Gold- und Silber Scheideanstalt vorm. Roessler and O. Liebknecht. June 14, 1924. Addition to 207,830.

242,689. Colloidal suspensions, Process for the production of. G. C. Hurrell. July 17, 1924.

242,711. Dyeing, printing or stencilling of acetyl cellulose or products made therewith. British Celanese, Ltd., G. H. Ellis, and W. O. Goldthorpe. August 14, 1924.

242,721. New acid and its salts strongly absorbing ultra violet rays, Process of producing. T. Suzuki and S. Sakurai. August 18, 1924.

242,739. Purifying oils and fats under high vacuum by means of steam or the like, Process of. Metallbank und Metallurgische Ges. Akt-Ges. and W. Gensecke. September 17, 1924.

242,741. Combustible gases, Production of. H. A. Humphrey and Synthetic Ammonia and Nitrates, Ltd. September 24, 1924.

242,805. Bleaching powder, Stabilising of. A. Lamble and United Alkali Co., Ltd. December 15, 1924.

242,837. Vat colouring matters, Manufacture and production of. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) February 18, 1925. Addition to 204,249.

242,867. Dyestuffs, Manufacture of. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) March 30, 1925.

242,876. Splitting coal, oils, and other hydrocarbons by heating these materials with hydrogen under high pressure, Process for. E. C. R. Marks. (*Internationale Bergin Cie voor Olie- en Kolen-Chemie.*) April 27, 1925.

Applications for Patents

Ashcroft, E. A. Treatment of ores, etc. 29,979, 29,980. November 27.

Ashcroft, E. A. Electrolytic separation and recovery of constituents of metallic salts. 29,981, 29,982. November 27.

Associated Lead Manufacturers, Ltd., Duncan, J. B., and Waring, H. Manufacture of lead pigments. 29,638. November 24.

Associated Lead Manufacturers, Ltd., and Waring, H. Manufacture of white lead. 29,707. November 24.

Badische Anilin and Soda Fabrik and Johnson, J. Y. Manufacture of iron carbonyl. 29,773. November 25.

British Dyestuffs Corporation, Ltd. Discharge effects on acetyl-cellulose materials. 29,793. November 25.

Bulmer, Sir J. W. Dyeing-machines. 29,837. November 26.

Chafen, L., and Monson, H. J. Emulsifying-apparatus. 29,835. November 26.

Chemische Fabrik auf Actien, vorm. E. Schering. Manufacture of polyiodine-substituted isatin. 29,541. November 23. (Germany, December 10, 1924.)

Chemische Fabrik auf Actien, vorm. E. Schering. Manufacture of an iodine-substituted oxindol. 29,542. November 23. (Germany, December 10, 1924.)

Colloidal Products Co., Inc. Processes of making soaps, etc. 29,798. November 25. (United States, November 25, 1924.)

Distilleries des Deux-Sèvres. Manufacture of ether oxides of the fatty series. 29,802. November 25. (Belgium, November 26, 1924.)

Endert, D. C., Mulder, J. Process for removing liquid residues from tanks, etc. 30,002. November 27.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of lacquers, etc. 29,543. November 23. (Germany, November 26, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Carbonisation processes. 29,937. November 26. (Germany, January 13.)

Farbwerke vorm. Meister, Lucius, and Brüning. Process of dyeing cellulose esters and ethers. 29,803, 29,804. November 25. (Germany, November 25, 1924.)

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of azo-dyestuffs, etc. 30,024. November 27. (Germany, November 27, 1924.)

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of anthraquinone derivatives. 30,131. November 28. (Germany December 12, 1924.)

Flammer, E. and Kelber, C. Manufacture of soap. 29,559. November 23.

Goodricke, L. F., Nesfield, A. C. Manufacture of soap. 29,526. November 23.

Huebner, J., Maurer Textilmaschinen Ges., and Sindl, O. Centrifuges. 28,905. November 17.

Ingham, T. Manufacture of alginic acid and alkaline alginates. 30,074. November 28.

Kalle and Co. Akt.-Ges. Production of nitriles of the benzanthrone series. 28,946. November 17. (Germany, November 17, 1924.)

Lambert, A. Manufacture of alkali salts. 29,096. November 18.

Legeler, E. Separation of sulphur from sulphur solutions. 29,928. November 26. (Germany, July 6.)

Lewis, G. P. Treatment of solid carbonaceous matters to obtain organic compounds, etc. 29,371. November 20.

Molybdenum Corporation of America. Compositions for alloying molybdenum with other metals. 29,436. November 21. (United States, December 30, 1924.)

Mond, A. L. (Metallbank und Metallurgische Ges.) Elimination of zinc from ores, etc. 28,995. November 17.

Naamlooze Vennootschap Philips' Gloeilampenfabrieken and Tennant, W. J. Manufacture of fluorine. 30,105. November 28.

Naamlooze Vennootschap Philips' Gloeilampenfabrieken and Tennant, W. J. Process of separating a mixture of hafnium and zirconium. 30,106. November 28.

Pongratz, A., and Zinke, A. Process for quantitatively halogenising perylene, etc. 30,123. November 28. (Austria, December 19, 1924.)

Rhenania Verein Chemischer Fabriken Akt.-Ges. Transformation of gypsum. 29,564. November 23. (Germany, December 2, 1924.)

Rowe and Co., Ltd., T. B. Manufacture of soap. 29,673. November 24.

Schmalenbach, A. Distillation process. 29,546. November 23. (Germany, December 22, 1924.)

Simpson, S. H. Manufacture of soap. 29,853. November 26.

Soc. of Chemical Industry in Basle. Manufacture of sulphur dyestuffs. 29,806. November 25. (Switzerland, November 28, 1924.)

Stokes, R. O. Tanks for treatment of liquids or solids mixed with liquids. 29,978. November 27. (October 3, 1924.)

Wilhelm, F. Process of working up acid resins obtained from refining of mineral oil derivatives. 29,884. November 26. (Roumania, June 30.)

Wohlers, F. T. Apparatus for making anhydrous metallic chlorides. 29,548. November 23.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£20 per ton.
ACID BORIC, COMMERCIAL.—Crystal, £40 per ton, Powder, £42 per ton.
ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.
ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.
BLEACHING POWDER.—Spot, £10 10s. d/d; Contract, £8 10s. d/d, 4-ton lots.
BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.
BORAX, COMMERCIAL.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
CALCIUM CHLORATE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE.—4½d. per lb.
POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.
SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. paid.
SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.
SODA CAUSTIC, SOLID.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 30s. less for contracts.
SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.
SODIUM BICHROMATE.—3½d. per lb.
SODIUM BISULPHITE POWDER 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
SODIUM CHLORATE.—3d. per lb.
SODIUM NITRATE, REFINED 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.
SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.
SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.
SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.
SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¼d. to 4¾d. per lb. Crude 60's, 1s. 3d. to 1s. 4d. Very poor demand
ACID CRESYLIC 97/99.—1s. 5d. to 1s. 7d. per gall. Pale, 95%, 1s. 4d. to 2s. 3d. per gall. Dark, 1s. 3d. to 2s. per gall. Good demand.
ANTHRACENE PASTE 40%.—3d. per unit per cwt.—Nominal price. No business.
ANTHRACENE OIL, STRAINED.—8½d. per gall. Good inquiry. Unstrained, 8d. per gall.
BENZOL.—Crude 65's, 1s. 2d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 2s. 1d. to 2s. 3d. per gall., ex works in tank wagons. Firm.
TOLUOL.—90%, 1s. 8½d. per gall. More inquiry. Pure, 2s. 2d. per gall.
XYLOL COMMERCIAL.—1s. 10d. to 2s. 3d. per gall. Pure, 2s. 1d. to 3s. 3d. per gall.
CREOSOTE.—Cresylic, 20/24%, 8½d. per gall. Market very quiet. Standard specification, 7d. to 7¼d. per gall.; middle oil, heavy, 6¼d. per gall. Market steady.
NAPHTHA.—Crude 9½d. per gall. Solvent 90/160, 1s. 5d. to 2s. per gall. Fair business. Solvent 90/190, 1s. 1½d. to 1s. 2d. per gall. Moderate demand.
NAPHTHALENE CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed or hot pressed, £5 10s. to £6.
NAPHTHALENE.—Crystals and Flaked, £9 to £10 per ton, according to districts.
PITCH.—Medium soft, 45s. to 47s. 6d. per ton, according to district Market active; prices advanced.
PYRIDINE.—90/160, 20s. per gall. Firmer. Heavy, 9s. 6d. to 10s. per gall. More inquiry.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

ACETIC ANHYDRIDE 95%.—1s. 7d. per lb.
ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—7s. per lb. 100%.
ACID BENZOIC.—1s. 9d. per lb.
ACID GAMMA.—9s. per lb.
ACID H.—3s. 6d. per lb. 100% basis d/d.
ACID NAPHTHIONIC.—2s. 2d. per lb. 100% basis d/d.
ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.
ACID SULPHANILIC.—9d. per lb. 100% basis d/d.
ALUMINIUM CHLORIDE, ANHYDROUS.—10d. per lb. d/d.
ANILINE OIL.—7½d. per lb. naked at works.
ANILINE SALTS.—8d. per lb. naked at works.
ANTIMONY PENTACHLORIDE.—1s. per lb. d/d.
BENZALDEHYDE.—2s. 1½d. per lb. Good home inquiry.
BENZIDINE BASE.—3s. 6d. per lb. 100% basis d/d.
BENZYL CHLORIDE 95%.—1s. 1d. per lb.
p-CHLORPHENOL.—4s. 3d. per lb. d/d.
p-CHLORANILINE.—3s. per lb. 100% basis.
o-CRESOL 29/31° C.—3d. per lb. Demand quiet.
m-CRESOL 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-CRESOL 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
DICHLORANILINE.—2s. 3d. per lb.
DICHLORANILINE S. ACID.—2s. 3d. per lb. 100% basis.
DIETHYLANILINE.—4s. 3d. per lb. d/d., packages extra, returnable.
DIMETHYLANILINE.—2s. per lb. d/d. Drums extra.
DINITROBENZENE.—9d. per lb. naked at works.
DINITROCHLORBENZENE.—£84 10s. per ton d/d.
DINITROTOLUENE.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 10d. per lb. naked at works.
DIPHENYLANILINE.—2s. 10d. per lb. d/d.
G. SALT.—2s. 2d. per lb. 100% basis d/d.
a-NAPHTHOL.—2s. per lb. d/d. Fair home inquiry.
B-NAPHTHOL.—11d. to 1s. per lb. d/d. Fair home inquiry.
a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d. Fair home inquiry.
B-NAPHTHYLAMINE.—3s. 9d. per lb. d/d. Fair home inquiry.
o-NITRANILINE.—5s. 9d. per lb.
m-NITRANILINE.—3s. 6d. per lb. d/d.
p-NITRANILINE.—1s. 11d. per lb. d/d. Fair home inquiry.
NITROBENZENE.—5d. to 5½d. per lb. naked at works. Good home inquiry.
o-NITROCHLORBENZOL.—2s. 3d. per lb. 100% basis d/d.
NITRONAPHTHALENE.—10d. per lb. d/d.
p-NITROPHENOL.—1s. 9d. per lb. 100% basis d/d.
p-NITRO-*o*-AMIDO-PHENOL.—4s. 6d. per lb. 100% basis.
m-PHENYLENE DIAMINE.—4s. per lb. d/d.
p-PHENYLENE DIAMINE.—9s. 9d. per lb. 100% basis d/d.
R. SALT.—2s. 4d. per lb. 100% basis d/d.
SODIUM NAPHTHIONATE.—1s. 9d. per lb. 100% basis d/d.
o-TOLUIDINE.—9d. per lb. Good home inquiry.
p-TOLUIDINE.—2s. 3d. per lb. naked at works.
m-TOLUYLENE DIAMINE.—4s. per lb. d/d.
m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8. Quiet market. Grey, £14 10s. per ton. Liquor, 9d. per gall. 32° Tw.
ACETONE.—£73 per ton.
CHARCOAL.—£7 to £9 per ton, according to grade and locality. Demand fair.
IRON LIQUOR.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.
RED LIQUOR.—10d. to 1s. per gall. 15° Tw.
WOOD CREOSOTE.—2s. 7d. per gall. Unrefined.
WOOD NAPHTHA, MISCIBLE.—5s. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P. Very quiet.
WOOD TAR.—£3 15s. to £5 per ton, according to grade.
BROWN SUGAR OF LEAD.—£40 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7¼d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7¼d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—2s. per lb.
BARYTES.—£3 10s. to £6 15s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 4d. per lb.
CARBON BISULPHIDE.—£25 to £28 per ton, according to quantity.
CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£55 to £60 per ton, according to quantity, drums extra.
CHROMIUM OXIDE, GREEN.—1s. 3d. per lb.
DIPHENYLGUANIDINE.—4s. to 4s. 3d. per lb.
INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.
LAMP BLACK.—£43 per ton, barrels free.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE, 30%.—£22 10s. per ton.
MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.
SULPHUR.—£9 to £11 per ton, according to quality.
SULPHUR CHLORIDE.—4d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£50 to £55 per ton.
THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb.
THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.
VERMILION, PALE OR DEEP.—5s. per lb.
ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£39 per ton ex wharf London in glass containers.
ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 7d. per lb. Keen competition continuing. Good demand.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.
ACID, BORIC B.P.—Crystal, £46 per ton; Powder, £50 per ton. Carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 4d. per lb., less 5%. Unsettled.
ACID, GALLIC.—2s. 9d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—5s. 6d. per lb. Resublimed, 9s.
ACID, SALICYLIC.—1s. 3d. to 1s. 5½d. per lb. Technical.—10½d. to 11d. per lb.
ACID, TANNIC B.P.—2s. 10d. per lb.
ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.
AMIDOL.—6s. 6d. per lb., d/d.
ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—12s. 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—10s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—12s. 9d. to 14s. 9d. per lb.
BISMUTH CITRATE.—11s. 4d. to 13s. 4d. per lb.
BISMUTH SALICYLATE.—10s. 2d. to 12s. 2d. per lb.
BISMUTH SUBNITRATE.—10s. 9d. to 12s. 9d. per lb. according to quantity.
BORAX B.P.—Crystal, £29; Powder, £30 per ton. Carriage paid any station in Great Britain.
BROMIDES.—Potassium, 1s. 9d. to 1s. 11d. per lb.; sodium, 2s. to 2s. 2d. per lb.; ammonium, 2s. 3d. to 2s. 5d. per lb., all spot. Prices reduced.
CALCIUM LACTATE.—1s. 4d. to 1s. 5½d. Market firmer.
CHLORAL HYDRATE.—3s. 5d. to 3s. 6d. per lb., duty paid.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
FORMALDEHYDE.—£41 per ton, in barrels ex wharf.
GLYCEROPHOSPHATES.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
GUAIACOL CARBONATE.—6s. to 6s. 6d. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.
HYDROQUINONE.—4s. 4¾d. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 1s. 11d. to 2s. 2d. per lb. Prices advanced.
MAGNESIUM CARBONATE.—Light Commercial, £33 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £70 per ton, less 2½ %, price reduced; Heavy Commercial, reduced to £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
MENTHOL.—A.B.R. recrystallised B.P., 42s. 6d. net per lb., December delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make. Very heavy demand.
MERCURIALS.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 9d. to 3s. 11d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 4s. to 4s. 2d. per lb. Market firmer.
METHYL SALICYLATE.—1s. 8d. per lb. Demand increasing, price firmer.
METHYL SULPHONAL.—16s. 9d. per lb.
METOL.—9s. per lb. British make.
PARAFORMALDEHYDE.—1s. 11d. for 100% powder.
PARALDEHYDE.—1s. 2d. to 1s. 6d. per lb., according to quantity.
PHENACETIN.—4s. to 4s. 3d. per lb.
PHENAZONE.—6s. to 6s. 3d. per lb. Spot lower than forward price.
PHENOLPHTHALEIN.—4s. to 4s. 3d. per lb. Supply exceeds demand.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.
POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.
POTASSIUM IODIDE.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
POTASSIUM METABISULPHITE.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 7½d. per lb., spot. slightly easier.
QUININE SULPHATE.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
RESORCIN.—3s. 9d. per lb. In fair quantities.
SACCHARIN.—51s. 5d. to 53s. 8d. per lb., according to quantity. Limited inquiry.
SALOL.—3s. per lb.
SILVER PROTEINATE.—12s. per lb. for satisfactory product light in colour.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity. Advanced.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
SODIUM METABISULPHITE CRYSTALS.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 80s. per cwt., according to quantity.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. per lb. Crystal, 1s. 11d. to 2s. 1d. per lb. Very heavy demand.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—12s. per lb. Limited demand.
THYMOL.—12s. to 15s. per lb.

Perfumery Chemicals

ACETOPHENONE.—9s. per lb.
AUBEPINE (EX ANETHOL).—10s. 3d. per lb.
AMYL ACETATE.—3s. per lb.
AMYL BUTYRATE.—6s. 6d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—6s. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 4d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 4d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 9d. per lb.
BENZYL BENZOATE.—2s. 9d. per lb.
CINNAMIC ALDEHYDE NATURAL.—16s. 9d. per lb.
COUMARIN.—11s. 9d. per lb.
CITRONELLOL.—16s. per lb.
CITRAL.—9s. 6d. per lb.
ETHYL CINNAMATE.—9s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—10s. per lb.
GERANIOL (PALMAROSA).—22s. 6d. per lb.
GERANIOL.—8s. to 16s. per lb.
HELIOTROPINE.—6s. 3d. per lb.
ISO EUGENOL.—14s. 6d. per lb.
LINALOL EX BOIS DE ROSE.—18s. per lb.
LINALYL ACETATE.—18s. per lb.
METHYL ANTHRANILATE.—9s. 3d. per lb.
METHYL BENZOATE.—5s. per lb.
MUSK KETONE.—40s. 6d. per lb.
MUSK XYLOL.—5s. 9d. per lb.
NEROLIN.—4s. per lb.
PHENYL ETHYL ACETATE.—14s. per lb.
PHENYL ETHYL ALCOHOL.—11s. 6d. per lb.
RHODINOL.—36s. 6d. per lb.
SAFROL.—1s. 4d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—21s. 6d. to 23s. 6d. per lb. Good demand.

Essential Oils

ALMOND OIL.—12s. 6d. per lb.
ANISE OIL.—3s. 9d. per lb.
BERGAMOT OIL.—Supplies uncertain.
BOURBON GERANIUM OIL.—14s. per lb.
CAMPHOR OIL.—60s. per cwt.
CANANGA OIL, JAVA.—11s. 3d. per lb.
CINNAMON OIL, LEAF.—5d. per oz.
CASSIA OIL, 80/85%.—11s. per lb.
CITRONELLA OIL.—Java, 85/90%, 3s. 7d. Business for 1926 supplies at higher prices. Ceylon, 2s. 4d. per lb.

CLOVE OIL.—7s. 3d. per lb.
EUCALYPTUS OIL, 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—French 38/40%, Esters, 28s. per lb.
LEMON OIL.—Supplies uncertain.
LEMONGRASS OIL.—4s. 9d. per lb.
ORANGE OIL, SWEET.—11s. 3d. per lb.
OTTO OF ROSE OIL.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
PALMA ROSA OIL.—13s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, no supplies available. Japanese, 25s. 6d. per lb.
PETITGRAIN OIL.—9d. per lb.
SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, December 4, 1925.

BUSINESS in the chemical trade continues on the whole satisfactory, although perhaps the volume of business during the past week has not been so great. Prices are exceptionally steady.

Export trade continues about the same, and although there is a very fair volume of inquiry in the market, much of the business offered is at unacceptable figures.

General Chemicals

ACETONE continues active, and the quotation is unchanged at £80 to £82 per ton.
ACID ACETIC is in relatively good demand, the price is £37 to £39 per ton for technical and £39 to £41 for 80% pure.
ACID FORMIC continues firm, and is quoted on the spot at round about £50 per ton.
ACID LACTIC is unchanged at £43 to £44 for 50% by weight material, and is in moderate demand.
ACID OXALIC is only in fair demand, with price unchanged at 3¾d. per lb.
ALUMINA SULPHATE continues active at £5 5s. to £5 10s. per ton for 17/18% material.
AMMONIUM CHLORIDE.—Demand continues inactive, and the quotation is nominally £19 to £20 per ton.
ARSENIC would appear to have slightly reacted from the bottom, and producers are now disinclined to sell for forward; nominally however, the price is unchanged.
BARIUM CHLORIDE continues firm, and spot prices are quoted at £9 to £9 10s. per ton.
BLEACHING POWDER is unchanged.
EPSOM SALTS continues firm and scarce at £5 10s. to £5 15s. ton.
FORMALDEHYDE is very scarce and quoted at £43 to £44 on the spot.
LEAD ACETATE continues firm at £44 to £45 per ton, and there has been a sharp improvement in the brown, which is now quoted at £43 per ton.
LIME ACETATE still remains firm, and is quoted at £17 15s. to £18 per ton.
LITHOPONE is nominally unchanged and has a firmer tendency.
POTASSIUM CARBONATE is in better demand, and is quoted at £23 per ton on the basis of 90/92%.
POTASSIUM CHLORATE.—Price is unchanged for this article at 4d. per lb., and there is a fair demand.
POTASSIUM PERMANGANATE has not been so active, and the material is offered at 7¾d. per lb.
SODIUM ACETATE.—Some good inquiries are in the market, and the material is firm at £17 10s. per ton.
SODIUM BICHROMATE is active at British makers' prices.
SODIUM HYPOSULPHITE is quiet and seems inclined to sag.
SODIUM NITRITE remains firm at £22 10s. per ton.
SODIUM PRUSSIATE is active and well called for at 4¾d. per lb.
SODIUM SULPHIDE is still weak and in poor demand.
ZINC SULPHATE is fairly well called for at £14 per ton.

Coal Tar Products

The market generally for coal tar products is very firm.
90% BENZOL.—The improved condition of benzol is well maintained, and the price is now definitely 1s. 10d. per gallon on rails, for the early part of next year.
PURE BENZOL is worth 2s. 1d. per gallon on rails.
CREOSOTE OIL is steady at 6¾d. per gallon on rails in the North, while the price in London is 7¼d. per gallon.
CRESYLIC ACID.—The pale quality 97/99% is unchanged at 1s. 10d. to 1s. 11d. per gallon on rails, while the dark quality 95/97% is worth 1s. 5d. to 1s. 6d. per gallon on rails.
SOLVENT NAPHTHA is firm at 1s. 5d. per gallon on rails.
HEAVY NAPHTHA is unchanged at 1s. 1d. per gallon on rails.
NAPHTHALENES are unchanged, the lower grades being worth from £4 to £4 10s. per ton, the 76/78% quality about £6 per ton, and the 74/76 quality about £5 10s. per ton.
PITCH remains in good demand, and prices are well maintained. To-day's quotations are 45s. to 47s. 6d. per ton f.o.b. main U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL firm and dearer. Spot, £36 10s.; December, £35 2s. 6d.; January-April, £35 7s. 6d.; May-August, £35 5s. RAPE OIL quiet. Crude, crushed, spot, £48 10s.; technical refined, £51 10s. COTTON OIL, slow. Refined common edible, £44; Egyptian crude, £37; deodorised, £46. TURPENTINE firm and 9d. to 1s. per cwt. higher. American, spot, 70s. 6d.; and January-April, 71s. 9d.

HULL.—LINSEED OIL.—Naked, spot, and December, £36; January-April, £35 17s. 6d.; May-August, £35 2s. 6d. COTTON OIL.—Naked, Bombay crude, £34; Egyptian crude, £35 10s.; edible renfined, £39; technical, £38 10s. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £44 10s. GROUNDNUT OIL.—Crushed-extracted, £44 10s.; deodorised, £48 10s. SOYA OIL.—Extracted and crushed, £40 5s.; deodorised, £43 15s. RAPE OIL.—Extracted and crushed, £47 per ton, net, cash terms, ex mill. CASTOR OIL easy. Pharmaceutical, 52s. to 54s.; first, 47s. to 49s.; second, 44s. to 47s. per cwt., barrels, net. COD OIL unaltered.

Nitrogen Products Market

Export.—At the moment the demand for sulphate of ammonia has eased down in several countries, notably in Germany and in the Philippines, but as a heavy demand is expected early in the new year prices remain firm. British producers are selling small quantities on the basis of £12 5s. per ton, f.o.b. U.K. port, in single bags, for December shipment. For January/April, shipment higher prices are being quoted in accordance with position.

Home.—There was a little spurt in the home demand during the last week in November as buyers wished to avoid paying the higher December prices for early requirements. It is not expected that home buying will be heavy until the end of January. Home prices have now been fixed for delivery up to the end of May and are as follows:—December, 1925 delivery, £12 13s. per ton; January 1926 delivery, £12 15s. per ton; February 1926 delivery, £12 18s. per ton; March/May 1926 delivery, £13 1s. per ton. For neutral quality basis 21.1 per cent. nitrogen delivered in 4 ton lots to consumer' nearest station.

Nitrate of Soda.—Throughout the month the market has been featurelesss with a complete absence of demand from consumers. In a lifeless market liner parcels have been disposed of from £11 5s. to £11 10s. per ton for prompt arrival, c.i.f. chief European ports. Higher prices are being charged for later arrivals. The depreciation of the franc has had an adverse effect on sales in France. In other countries consumers seem to be holding off just as they are with sulphate. It is anticipated that when the consuming season is nearer at hand there will be considerable livening.

Prices of Bismuth Salts

MAY AND BAKER, LTD., of Battersea, London, inform us of an advance in the prices of bismuth salts in accordance with to-day's higher price for the metal. The quantity prices are as under and apply only for cash terms; smaller quantities would be charged extra.

	Under 1 cwt.		No less than 1 cwt.	
	s.	d.	s.	d.
Bismuth carbonate	16	0	15	9 lb
,, citrate	13	3	13	0 ,,
,, nitrate cryst.	10	6	10	3 ,,
,, oxide	17	6	17	3 ,,
,, salicylate	13	0	12	9 ,,
,, subchloride	15	0	14	9 ,,
,, subgallate	11	3	11	0 ,,
,, subnitrate	13	6	13	3 ,,
Liquor Bismuthi P.B. in W. Qts.			1	4 ,,
12 ,, ...			1	3 ,,
36 ,, ...			1	2½ ,,

Quantities of 2 cwts. and upwards, for prompt delivery, or deliverable over 3 months, are subject to a rebate of 3d. per lb. on completion, and the various salts may be taken in assorted quantities, if so required. All details are subject to net cash in 14 days and without engagement.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, December 3, 1925.

THE Heavy Chemical Market continues to hold out prospects of better business being done in the near future, inquiries for delivery early in the year being numerous. There are one or two advances in prices recorded this week, but nothing outstanding.

Industrial Chemicals

ACID ACETIC 98/100%.—In usual steady demand. Quoted £55 to £67 per ton according to quality and packing, c.i.f. U.K. ports. 80% Pure, £40 to £41 per ton. 80% Technical, £38 to £39 per ton, packed in casks c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton. Powdered, £42 per ton packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Demand rather poor. Quoted 4½d. per lb. delivered or f.o.b. U.K. ports, but could probably be obtained for less.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at about 1s. 3½d. per lb., less 5% ex wharf. In moderate demand.

ACID FORMIC 85%.—In rather better demand and price advanced to about £47 per ton ex wharf. Prompt shipment from the continent.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy ex works.

ACID NITRIC 80°.—Remains unchanged at £23 5s. per ton ex station, full truck loads.

ACID OXALIC 98/100%.—Rather dearer quotations from the continent. Now quoted 3¾d. per lb. ex wharf. Prompt shipment. Some spot material still available at this figure.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Steady demand and price unchanged at about 11½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—On offer from the continent at about £5 10s. per ton c.i.f. U.K. ports. Spot material available at £6 5s. per ton ex store.

ALUM, LUMP POTASH.—Quoted £7 15s. per ton c.i.f. U.K. ports. Spot material available at about £9 2s. 6d. per ton ex store. Powdered quality offered from the continent at £7 12s. 6d. per ton c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—In moderate demand and price unchanged at 1s. 4½d. per lb., less 5% ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton; packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID 880°.—In usual steady demand and price unchanged at 2½d. to 3d. per lb. delivered according to quantity.

AMMONIA MURIATE.—Grey galvanizers crystals, of British manufacture, quoted £26 to £27 per ton ex station. On offer from the continent at about £22 10s. per ton c.i.f. U.K. ports. Fine white crystals quoted £18 15s. per ton c.i.f. U.K. ports, prompt shipment from the Continent.

ARSENIC, REFINED WHITE CORNISH.—Price remains unchanged at about £17 10s. per ton ex wharf, early delivery. Spot material quoted £20 per ton ex store.

BARIUM CHLORIDE.—Large white crystals quoted £9 per ton ex store, spot delivery. On offer from the continent at about £7 15s. per ton c.i.f. U.K. ports. Fine white crystals, £7 5s. per ton c.i.f. U.K. ports.

BLEACHING POWDER.—English material unchanged at £9 10s. per ton ex station. Contracts 20s. per ton less. On offer from the continent at about £7 15s. per ton c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton ex works. Continental quoted £5 per ton c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton. Carriage paid U.K. stations.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental unchanged at about £3 12s. 6d. per ton c.i.f. U.K. ports.

COPPERAS, GREEN.—In good demand for export. Price unchanged at about £3 7s. 6d. per ton f.o.b. U.K. ports, packed in casks.

COPPER SULPHATE.—Good inquiry for export and English material advanced to about £24 per ton f.o.b. U.K. ports. Continental on offer at about £23 per ton ex wharf.

FORMALDEHYDE 40%.—Rather higher quotations from the continent Now quoted £40 per ton c.i.f. U.K. ports. Spot material still available at £41 per ton ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton ex store or station. Continental on offer at about £3 per ton c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £43 10s. per ton, ex store.

LEAD, WHITE.—On offer from the continent at about £43 per ton, ex wharf. Spot material quoted £44 per ton, ex store.

LEAD ACETATE.—White crystals offered from the continent at about £43 5s. per ton, c.i.f. U.K. ports. Spot material quoted £45 5s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports, according to quantity and destination. Spot material available at about £29 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Rather scarce for immediate delivery. Spot material quoted £27 per ton, ex store. Offered from the continent at £25 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE 98/100%.—Limited quantities available for prompt shipment from the continent at about £30 per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—99% refined granulated quoted £24 15s. per ton, c.i.f. U.K. ports. Spot material available at about £27 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7½d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—In good demand and price unchanged at about 7¾d. per lb., ex store. Offered for prompt shipment from the continent at about 7½d. per lb., ex wharf.

SODA CAUSTIC.—76/77%, £17 10s. per ton; 70/72%, £16 2s. 6d. per ton; broken 60%, £16 12s. 6d. per ton; powdered 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—On offer at about £18 5s. per ton, ex store, spot delivery. Quoted £17 15s. per ton, c.i.f. U.K. ports, prompt shipment.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M. W. quality 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb., delivered.

SODIUM CARBONATE.—Soda Crystals, £5 to £5 5s. per ton, ex quay or station, powdered or pea quality £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture unchanged at £9 10s. per ton, ex station, minimum ton lots; pea crystals, £14 per ton, ex station; continental commercial quality quoted £9 5s. per ton, ex store. Offered from the continent at £8 15s. per ton, c.i.f. U.K. ports.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the continent about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Still in good demand and price for spot material now about 4¾d. per lb., ex store. On offer from the continent at 4½d. per lb., ex wharf.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers advise a slight advance in price: 60/65%, solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton; crystals 31/34%, £8 12s. 6d. per ton. all delivered buyers works U.K., minimum 5 ton lots, with slight reduction for contracts. 60/62% solid quality offered from the continent at about £10 10s. per ton, c.i.f. U.K. ports. Broken £1 per ton more. Crystals 30/32%, £7 10s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 5s. per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—British material 96/98% quoted about £24 per ton, f.o.b. U.K. ports; 98/100% solid on offer from the continent at about £22 10s. per ton, c.i.f. U.K. ports. Powdered about 20s. per ton extra.

ZINC SULPHATE.—Of continental manufacture on offer at about £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—2s. to 2s. 1d. Some home inquiries.

BENZALDEHYDE.—2s. 2d. per lb. Some home inquiries.

BETA NAPHTHOL.—11d. to 1s. per lb. Some home inquiries.

DIMETHYLANILINE.—2s. per lb. Fair home inquiries.

NAPHTHIONATE OF SODA.—1s. 8d. to 1s. 9d. Some home inquiries.

SULPHANILIC ACID.—9d. per lb. Fair home inquiries.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, *December* 4, 1925.

Values on the chemical market hare since last report have kept up to recent levels in almost all departments, and only in a few cases can weakness be noted. The home demand for the leading lines of "heavies" is pretty well maintained and the improved tone which has been a feature of the market during the last month or so is still evident. At the moment export inquiry is not particularly active and most of the business that is passing is for shipment to the Colonies.

Heavy Chemicals

A quietly steady demand for soda crystals continues to be met with at round £5 5s. per ton. Caustic soda values are firm at from £15 12s. 6d. per ton for 60 per cent. quality to £18 for 76-77 per cent. strength, and demand is fairly active both on home and foreign account. Saltcake is still slow though at round £3 10s. per ton there is little change in price. Glauber salts are only in moderate request at about £3 5s. per ton. Acetate of soda is quiet but steady at £17 10s. per ton. Chlorate of soda is attracting a fair amount of attention and quotations still range round 2¾d. per lb. Sulphide of sodium is not very active but values are unchanged at about £11 15s. per ton for 60-65 per cent. concentrated solid and £9 10s. per ton for commercial material. Hyposulphite of soda is easy and is a rather slow seller; photographic crystals are on offer at about £14 per ton and commercial at £9. Phosphate of soda is inactive at £12 5s. to £12 10s. per ton. Alkali continues to attract a fair amount of buying interest and values are firm, current quotation being about £6 15s. per ton. Bicarbonate of soda meets with a moderate demand and prices are unchanged from last week at round £10 10s. per ton. Bichromate of soda is quoted at round 3½d. per lb. with business on the slow side. Bleaching powder is in fair inquiry at about £9 per ton. Prussiate of soda is steady at 4d. per lb. and a moderate volume of business is being put through.

Among potash compounds carbonate is selling in moderate quantities and values are firm at £25 10s. to £26 per ton for 96-98 per cent. material. Caustic potash is quiet but about unchanged from last report at round £27 per ton for 90 per cent. quality. Permanganate of potash is steady and in fair inquiry at 5¾d. to 6d. per lb. for commercial quality and round 7½d. for pharmaceutical. Bichromate of potash is rather inactive though still quoted at about 4½d. per lb. Yellow prussiate of potash is steady and in moderate demand at 7¼d. per lb. Chlorate of potash meets with a fair amount of inquiry and quotations still range round 4d. per lb.

Arsenic is slow though a slight improvement in demand has been reported in some quarters; prices, however, are no better, white powdered, Cornish makes being quoted at about £15 per ton on rails. Sulphate of copper is only in moderate request at £24 to £24 10s. per ton. Nitrate of lead is quiet but without change in price at £40 to £41 per ton. Acetate of lead is firm and in fair inquiry at £44 to £45 per ton for white material and £40 to £41 for brown. Acetate of lime is attracting moderate attention at £15 to £15 10s. per ton for grey and £8 for brown. Epsom salts are slow and easy at about £3 15s. per ton, with magnesium sulphate, B.P. quality, on offer at round £4 10s.

Acid and Coal Tar Products

Tartaric acid is still in limited request at last week's level of 11½d. per lb. Citric acid is slow though fairly steady at 1s. 3¼d. to 1s. 3½d. per lb. Oxalic acid is in moderate demand and values are maintained at round 3¾d. per lb. Acetic acid is still on offer at about £38 per ton for 80 per cent. commercial quality and £67 to £68 for glacial, a quietly steady demand being met with.

Among coal-tar products pitch is slightly steadier at 42s. 6d. per ton though business is far from brisk. Carbolic acid is inactive at 4¼d. per lb. for crystal and 1s. 4d. per gallon for crude. Crude qualities of naphthalene are fairly active at from £4 5s. per ton, with refined rather quiet at £12 10s. per ton. Creosote oil is about unchanged at round 6d. per gallon. Solvent naphtha is slow at 1s. 5d. to 1s. 5½d. per gallon.

Sulphate of Ammonia Prices

The British Sulphate of Ammonia Federation announces the following prices for sulphate of ammonia for home agricultural use:—December, £12 13s.; January, £12 15s.; February, £12 18s.; March-May, £13 1s. per ton for neutral quality in fine friable condition, free from lumps, basis 21·1 per cent. nitrogen, delivered to consumer's nearest station in Great Britain, for prompt cash payment, in 4-ton lots and upwards. As no ordinary quality is likely to be available for the months referred to, no price is given for this.

In a circular giving these details the Federation says that "Owing to the continued depression in the iron and steel industries and to an unfortunate strike affecting the production from shale in Scotland, the output of sulphate of ammonia is far below normal and supplies in the spring months may not suffice to meet the home demand. It is therefore essential that orders should be booked well in advance of requirements this season. We do not propose to take advantage of any shortage of supply to raise prices; but as many of our members' works are idle or working short time, we may be put to considerable extra expense in meeting delivery charges. We therefore reserve to ourselves the right to raise the prices given below at any time, and we accordingly recommend you to place your orders for December-May delivery immediately."

Suggested Duty on Gas Mantles

The committee appointed by the Board of Trade to inquire into the gas mantle industry with regard to the question of import duties, has now issued its report. (H.M. Stationery Office, 3d. net.)

The report states that the committee accepts the broad fact that the continued production in this country of thorium and cerium is imperative, and they are satisfied that if mantles were not made here the economic production of thorium and cerium would go also, as there is apparently no prospect that they would find a sale abroad. The future of these two products is undoubtedly threatened by the present pressure on the mantle industry. Failing any other method of maintaining the thorium and cerium industries the committee recommends a flat import rate not exceeding 6s. per gross.

Corrosion of Ferrous Metals

At Birmingham University Chemical Society, on Monday a paper on "Corrosion" was read by Mr. J. P. Baxter, B.Sc. The various early chemical theories of corrosion of ferrous metals were discussed, and the acid and electrolytic theories were also considered. The futility of the controversy between these two theories was pointed out, and the fact was stressed that, though they were academically opposed, they did in reality reach similar conclusions. The paper next dealt with Dr. Friend's colloid theory, showing its application to various problems which the older theories were unable to explain. The influence of various constituents and of structure on the corrodibility of the metal was considered, and also the effect of the nature of the electrolyte. Finally, the small amount of our knowledge of this subject was remarked on, and it was pointed out what a large field the subject offered for research.

New Artificial Silk Co.

A new company, the Bulmer Rayon Co., has been registered and will take over the Stowmarket artificial silk works of Smith, Bulmer and Co., of Halifax (see our Company News column). The directors are Sir W. Bulmer, managing director; Sir W. Edge, director of W. Edge and Sons, chemical manufacturers; Messrs. C. B. Clay, of J. and C. B. Clay, textile merchants; J. W. Drake, chairman and managing director of Drakes, Ltd., and J. Clay, of J. Clay and Co., spinners, Bradford.

Chemical Engineering Group Works' Visit

The Chemical Engineering Group of the Society of Chemical Industry has arranged a joint meeting with the Nottingham Section for Wednesday, December 16, when the works of Boots' Pure Drug Co., Ltd., will be visited. In the evening a paper on "Some Effects of Humidity on the Properties of Fabrics, with special reference to the Control of Humidity during Strength Tests," will be presented by Messrs. R. G. Parker, F.I.C., and D. N. Jackman, A.I.C.

Company News

CHLORIDE ELECTRICAL STORAGE CO.—An interim dividend of 5 per cent., tax free, is announced.

ROYAL DUTCH PETROLEUM CO.—An interim dividend of 10 per cent. is payable on January 5 next.

KAYE'S RUBBER LATEX PROCESS.—The report for the year to October 31 last shows a net profit of £7,453.

SHELL TRANSPORT AND TRADING CO.—An interim dividend of 10 per cent. (2s. per share) is payable on January 5 next.

BARROW, HEPBURN AND GALE.—The profit for the year to September 30 last amounted to £37,939, plus £19,752 brought in.

BRITISH OXYGEN CO.—An interim dividend of 9d. per share, less tax, has been declared. A similar distribution was made a year ago.

TATE AND LYLE, LTD.—A final dividend of 9¼ per cent., less tax, making 13¼ per cent. for the year, has been declared on the ordinary shares.

BLEACHERS' ASSOCIATION, LTD.—The directors have declared an interim dividend on the ordinary shares of 5 per cent. actual, less tax, the same as for the corresponding period last year.

SIAMESE TIN SYNDICATE.—The directors announce a fourth interim dividend of 15 per cent. (9d. per share), less income tax at 4s. 1½d. in the £, in respect of the current year, payable on December 15.

CENTRAL OIL AND CHEMICALS TRUST, LTD.—At a meeting held on November 27 a resolution changing the name of the company to the "Central Oil, Mining and Chemicals Trust, Ltd." was confirmed.

CASSEL CYANIDE CO.—The net profits for the year ended September 30 amounted to £56,908 and £14,296 was brought forward. A final dividend of 6d. per share is proposed, and £18,329 is carried forward.

LONDON NITRATE CO.—The annual meeting of shareholders fixed for November 30 at Liverpool had to be adjourned, owing to the absence of two directors, after the passing of a formal resolution sanctioning the payment of the proposed dividend of 3s. 6d. per share, free of income tax.

BULMER RAYON CO.—On Monday a prospectus was published announcing an issue at par of 500,000 8 per cent. cumulative preference shares of £1 each and 750,000 deferred ordinary shares of 1s. each. The subscription lists were closed early on Tuesday, the issue having been over-subscribed.

SANTIAGO NITRATE CO.—A gross profit of £21,662 is reported for the year ended June 30. The net profit is £10,306, which, added to the £10,616 previously standing to the credit of profit and loss, makes a total of £20,922. It is proposed to pay a dividend of 7½ per cent., less tax, and to carry forward £8,922.

CELLULOSE HOLDINGS AND INVESTMENT CO., LTD.—An extraordinary general meeting of shareholders will be held at Winchester House, London, on December 10, at 2.30 p.m., for the purpose of placing the facts concerning the dismissal of the company's representative from the board of British Celanese, Ltd., by the latter company.

CASTNER-KELLNER ALKALI CO.—For the year ended September 30 last a final dividend of 14 per cent. is proposed, making 22 per cent. for the year; £70,636 is placed to reserve, and a balance of £28,008 carried forward, against £22,086 brought in. The distribution for the previous year was similar to that now announced and £75,000 was reserved.

AMALGAMATED ZINC (DE BAVAY'S).—A meeting will be called at an early date to confirm a suggestion made by the Board that the company's holding of 300,000 ordinary shares of the Electrolytic Zinc Co. of Australasia be distributed among the holders of the shares of the Amalgamated Zinc Co. in the proportion of three Electrolytic Zinc shares to five Amalgamated Zinc shares.

DORMAN, LONG AND CO.—The accounts for the year ended September 30 last show a profit of £231,169, to which is added the balance brought forward making a total of £441,321. After meeting debenture interest and redemption charges, the dividend on the preference shares for the twelve months, and setting aside £50,000 for depreciation, there is a surplus of £122,054 to carry forward. The annual meeting will be held in Middlesbrough on December 15 at 12 noon.

HERBERT GREEN AND CO., LTD.—The Distillers Co., Ltd., Edinburgh, have made an offer to purchase the whole of the issued capital of Herbert Green and Co., Ltd., Hull. The issued capital consists of 145,000 fully paid ordinary shares of £1 each, and 125,000 deferred shares of 1s. each. The offer is the payment of 25s. per share for the ordinary and 2s. 6d. for the deferred shares. Mr. Herbert Green, the managing director, is to be retained and special compensation of £10,000 paid to him.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, of Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to December 25, 1925.

"ESTEROL."

B457,803. For a liquid composition for use in the dyeing and finishing of textile fabrics in the course of manufacture. H. C. Barnett and Co., Ferdinand Street Works, Oldham Road, Manchester, Lancashire; manufacturers. April 3, 1925. User claimed from March 31, 1920.

"TARCOLINE."

462,529. For material to be applied in the manner of paint to the surface of roads for making lines for traffic regulation or direction. Class 1. R. S. Clare and Co., Ltd., 8, Stanhope Street, Liverpool, Lancashire; manufacturers. September 22, 1925. (By consent.)

"MATAMEL."

462,992. For graining colours. Class 1. Postans and Morley Brothers, Ltd., Trevor Street Works, Trevor Street, Nechells, Birmingham; paint, varnish and colour manufacturers. October 7, 1925.

"HUACET."

463,009. For calcium carbide. F. A. Hughes and Co., Ltd., 204 to 206, Great Portland Street, London, W.1.; general merchants. October 7, 1925.

"FLIRUS."

463,138. For a preservative preparation or composition for coating metal work. Class 1. Ernest Harding, 68, Bedminster Parade, Bristol; merchant. October 12, 1925.

Chemist's Successful Wages Claim

MATTHEW WILKINSON, chemist, Slack Road, Blackley, Manchester, sought to recover £714 arrears of salary, along with certain commission, from George Aspey and Son, oil and soap manufacturers, of Hull, at the Manchester Assizes, on Thursday, November 26.

The plaintiff's case was that in December, 1919, he was engaged as chief chemist in the defendant's works for five years at a salary of £7 per week. If the turnover on sales of sulphonated oils, soluble oils, and cutting oils made by the defendants reached £15,000 in any year, he should receive 1 per cent. commission on the turnover. If the turnover should exceed £15,000, he was to receive 1 per cent. on the first £15,000, and ½ per cent. on any amount above that sum.

For the defence, the agreement was admitted, but the plaintiff's interpretation was disputed. After alterations, about November 13, 1920, it was orally agreed that the first arrangement should be rescinded, and another agreement was made whereby the plaintiff was to go to Hull and manufacture a product known as "Leatherol," as the defendants should from time to time require, while he was to receive £3 10s. per week in Manchester, and £7 per week when in Hull.

The judge accepted the story of the plaintiff as to the agreements, and gave judgment for £638 arrears of salary and for the payment of commission on the turnover of sulphonated oil, soluble oils, and cutting oils between January 1, 1920, and February 1, 1925.

The

"VITREOSIL"

System *of* HYDROCHLORIC ACID ABSORPTION

THESE VESSELS set up Vertically one above the other can be thoroughly Water Cooled.

Economies of Floor Space and Efficiency of Operation are secured. There are no submerged joints.

In this System an intimate contact of the gas with the liquid is secured by means of the liquid curtain formed by the drops falling from the central depression and through which all the gas must pass.

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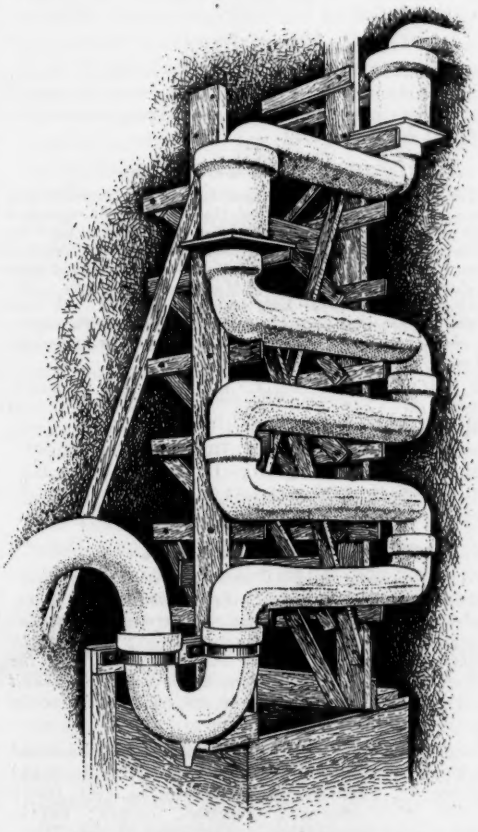

COLUMN OF "VITREOSIL" ABSORPTION VESSELS.

Specialists in Chemical Works Plant. ***Manufacturers of VITREOSIL.***

THE THERMAL SYNDICATE, Ltd.

VITREOSIL WORKS

WALLSEND-ON-TYNE, ENGLAND

London Depot: 28 Victoria Street, London, S.W.1 And at New York and Paris

Telephone Nos. 42 & 43 Wallsend. Telegrams: "Thermal, Wallsend."

ABC Code, 5th and 6th Editions, and Bentley's used.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

NORRIS BROS., LTD., 107-111, Moorgate Station Chambers, E.C., chemical manufacturers. (C.C., 5/12/25.) £13 18s. 2d. October 30.

Receivership

CLAYTON GLUE WORKS, LTD.—(R., 5/12/25.) R. T. Tiplady, of 12, Bowkers Row, Bolton, C.A., was appointed receiver on November 16, 1925, under powers contained in debentures dated April 20, 1923.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

NAYLOR BROS. (SCOTLAND), LTD., Slough, varnish manufacturers. (M., 5/12/25.) Reg. November 11, £650 bond and disposition in security, to Mrs. M. Fairlie or Paterson, Kincraig, Bearsden; charged on 205, Byres Road, Glasgow.

SYNTHETIC PRODUCTS CO., LTD., London, E.C. (M., 5/12/25.) Reg. November 24, £750 debentures, part of £3,500; general charge. *£10,700. June 22, 1925.

Deed of Arrangement

[*NOTE.—The following deed of arrangement with creditors has been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.*]

FARR, Francis William, 9, Coleherne Terrace, Richmond Road, West Brompton, analytical chemist. (D.A., 5/12/25.) Filed November 27. Trustee, A. G. White, 14, Old Jewry Chambers, E.C., C.A. Secured creditors, £1,027; liabilities unsecured, £708; assets, less secured claims, £920.

London Gazette, &c.

Winding Up Petition

VAUXHALL CHEMICAL CO., LTD. (W.U.P., 5/12/25.) A creditors' petition for winding up has been presented, and is to be heard at the Royal Courts of Justice, Strand, London, on December 8.

Bankruptcy Information

PICKLES, Robert Henry, Prussiate Works (also known as Manganese Mills), Droylsden, Manchester, trading as R. H. PICKLES AND CO., chemical manufacturer. First meeting, December 9, 3 p.m., Official Receiver's Offices, Byrom Street, Manchester. Public examination, January 25, 1.45 p.m., Town Hall, Ashton-under-Lyne.

Companies Winding Up Voluntarily

BRITISH CARBIDE FACTORIES, LTD. (C.W.U.V., 5/12/25.) By special resolution, November 5, confirmed November 23. H. C. Howard, 70a, Basinghall Street, London, E.C.2, appointed liquidator.

EVANS, SONS. LESCHER AND WEBB, LTD. (C.W.U.V., 5/12/25.) By special resolution, November 4, confirmed Nov. 19. J. H. E. Evans and T. E. Lescher, 56, Hanover Street, Liverpool, appointed joint liquidators.

WILLCOCKS (H. S.) AND CO. (CHEMICALS), LTD. (C.W.U.V., 5/12/25.) By special resolution, November 13, confirmed November 28. H. E. Evans, Parr's Bank Buildings, 3, York Street, Manchester, Chartered Accountant, appointed liquidator. Meeting of creditors at the offices of Morris, Gregory, Holmes and Hansford, 3, York Street, Manchester, on Monday, December 14, at 3 p.m. All creditors' will be paid in full.

Partnership Dissolved

GRIEVE AND GORDON (George Gillard GORDON, Sydney Boyle LAWRENCE and Albert Joseph SALOMON), distillers, refiners and distributors of eucalyptus oil and products, Eucalyptus Works, 7, 9 and 11, Burnley Road, Dollis Hill, London, N.W.10, by mutual consent as from October 31, 1925. Debts received and paid by G. G. Gordon.

New Companies Registered

EVANS, SONS, LESCHER AND WEBB, LTD., 36, Hanover Street, Liverpool. To acquire the business carried on at Liverpool and elsewhere by Evans, Sons, Lescher and Webb, Ltd. (in liquidation), and all or any of the assets thereof. Manufacturing chemists, wholesale druggists, drug grinders, importers, exporters, etc. Nominal capital, £450,000 in 750,000 preference and 600,000 ordinary shares, all of 6s. 8d. each.

PAUL MARTI AND CO., LTD., manufacturers, importers of, exporters and dealers and workers in celluloid, galalith, vulcanite, xylonite and any other allied products, also nitrocellulose for use in connection with lacquers, varnishes and the like. Nominal capital, £1,000 in £1 shares.

Q. S. SOAP PRODUCTS, LTD., 41, Castle Street, Liverpool. Soft and other soap manufacturers, manufacturers, refiners and dealers in all kinds of oils and oleaginous and saponaceous substances, etc. Nominal capital, £15,000 in £1 shares (11,250 7 per cent. cumulative preference and 3,750 ordinary).

UNITED CASTEROIL, SOAP AND SODA FACTORY, LTD., 1-2, Gracechurch Street, London, E.C.2. Manufacturers of and dealers in castor oil, soap, soda and analogous products or manufactures, wholesale chemical manufacturers, druggists, etc. Nominal capital, £1,000 in £1 shares.

Chemical Company's Shares Case

FURTHER evidence was given on Thursday, November 26, and at the resumed hearing on Wednesday this week in the Chancery Division of the action by Mr. W. Guy-Pell, of Hyde Park Place, against Mr. Joseph Day, of St. Margarets-on-Thames (reported in THE CHEMICAL AGE last week).

Mr. Fredk. Ralph Judson, formerly secretary to the Catalytic Chemical Co., said that the total sale of caramel was 59 cwts. 118 lb., which fetched £111 1s. 5d. Some butyric acid was produced and in 1921 delivered to the value of £972. He never heard of any substantial contracts for lactic acid, none being made for sale purposes, and no pyrogallic acid was produced.

Mr. Day said that he told the plaintiff all about Dr. Walkey's experiments and advised him to see Dr. Walkey at the factory first, as the plaintiff had suggested coming into the company. He did give him a page of some document, but nothing in the nature of a prospectus. At the factory the plaintiff was shown the plant by Dr. Walkey and sent the application for shares after his visit. He denied that the document referred to was a prospectus, that he ever issued it, that he gave a copy of it to the plaintiff, or that he had made any misrepresentations as alleged. He admitted that there were some mis-statements in the so-called prospectus.

His lordship adjourned the case until December 17.

Herbert Green & Co.

DETAILS will be found in our Company News of a proposal by the Distillers Co. to take over the shares of H. Green & Co., Hull.